Vol. XXXII OCTOBER, 1922 No. 10

THE LARYNGOSCOPE

AN INTERNATIONAL MONTHLY JOURNAL
DEVOTED TO DISEASES OF THE

EAR - NOSE - THROAT

FOUNDED IN 1896 BY

DR. M. A. GOLDSTEIN, St. Louis,

Managing Editor and Publisher.

For Contents See Page 1.

Subscription, $6.00 per Annum, in Advance.

Foreign Subscription, 35 Shillings per Annum, Post Free.
Single Copies, 75 cents.

PUBLISHED BY THE LARYNGOSCOPE CO.

3858 Westminster Place, St. Louis, Mo., U. S. A.

FOREIGN OFFICE, BAILLIERE, TINDALL & COX,

8 HENRIETTA ST., STRAND, LONDON, ENG.

[Entered at the Postoffice at St. Louis, Mo., as Second-Class Matter, in July, 1896.]

Vol. 1 JULY, 1922 No. 3.

ORALISM AND AURALISM

A QUARTERLY JOURNAL
DEVOTED EXCLUSIVELY TO SPEECH PROBLEMS

Subscription, $2.00 per Annum.
Single Copies, 50 cents.

PUBLISHED BY
THE LARYNGOSCOPE CO., ST. LOUIS.

Entered at the Postoffice at St. Louis, Mo., as Second-Class Matter, February, 1922

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VOL. XXXI ST. LOUIS, OCTOBER, 1922 No. 10

ORIGINAL COMMUNICATIONS.

(Original Communications are received with the understanding that they are contributed exclusively to THE LARYNGOSCOPE.)

STREPTOCOCCUS HEMOLYTICUS MASTOIDITIS.

DR. A. M. DUNLAP, Peking, China.

Early in November of last year, an epidemic of septic sore throats made its appearance in Peking, China, and a number of the larger centers within a day's journey by rail. Individuals attacked were usually prostrate for a day or two with evening temperatures ranging from 101° to 102°. Occasionally symptoms were so slight as to pass almost unnoticed. Throats were found to be acutely inflamed with usually a thin white pseudo membrane on the tonsil, the posterior pharyngeal wall or, not infrequently, the anterior pillar. Bacteriological examination demonstrated the streptococcus hemolyticus to be the predominating organism in all throat cultures. The epidemic probably would have attracted very little attention had there not been a great many cases of mastoiditis complicating the disease, from all of which the streptococcus hemolyticus was obtained in pure culture. This organism seemed to extend to the middle ear and mastoid cells with singular ease, but showed no inclination to invade the lower respiratory tract. While there was one case of meningitis following a mastoid complication and two cases of septicemia, one following mastoid disease and one probably following a mild throat infection, there was no diagnosed case of lung complication.

The primary object of this paper is to report the mastoid cases of the epidemic and in so doing to emphasize the fact that the invasion of mastoid cells by the streptococcus hemolyticus produces

a mastoiditis which is characteristic and should be recognized as such in order to insure proper operative and, what is perhaps quite as important, post-operative treatment. Bacon[1] and Whiting[2] have reported cases of mastoiditis caused by the streptococcus mucosus capsulatus, which resemble in many respects those of this series. They do not describe, however, the post-operative course of their cases in detail so that it is impossible to make a satisfactory comparison. It is probable that while there are many points of similarity, there are certain characteristic differences which make it possible to separate them clinically. The cases which we have had this winter, with type one and type two sub-group pneumococci as the causative agents, have given many of the same pre-operative symptoms as the streptococcus cases, but their post-operative course has been entirely different. A study of the cases as reported would seem to justify us in grouping acute mastoiditis according to the causative organism. Further research will make possible the combining of certain groups and the emphasizing of others.

The cases of mastoiditis described below, therefore, belong to a distinct group and the disease should be known as *streptococcus hemolyticus mastoiditis*. The writer is of the opinion that this disease is as much an entity as some of the older types of conjunctivitis, such as gonorrheal ophthalmia and trachoma, or as the different types of cerebral spinal meningitis. It is to be hoped that the work already started in various centers in the study of the bacteria of acute ear infections may help to make us more accurate in the diagnosis of acute mastoiditis, and also that future text-book writers may separate the general subject of acute mastoiditis into the different types or groups which are becoming more clearly established. To this end, it is not too much to ask that it become the practice of all otologists to examine carefully the bacteria of the discharges from all cases of acute otitis media and mastoid wounds. By so doing, not only will our special knowledge be increased, but as individuals, we shall understand why, in some cases, the middle ear fails to become dry within the classical six to ten-day period; why we lose a certain number of cases with meningitis when the mastoid wound is well on the road to recovery; when we may safely employ Dr. Hammond's[3] method of closure, and many other things which will help in the proper conduct and post-operative care of our patients.

Pure cultures of the streptococcus hemolyticus were obtained in all the cases of this series from swabs taken from the mastoid cavities, either at operation or within forty-eight hours after operation.

Ser. No.	Strain No.	SOURCE	Gram Strain	Blood Agar Plate	Growth in Bouillon	Loefflers Blood Serum	Gelatine
1.	X-3	Middle Ear	Positive	Hemolysis	Sedimenting	Minute, grayish colonies. No liquefaction	No liquefaction
2.	2329	Mastoid	"	"	Diffusely	Minute, grayish colonies. No liquefaction	"
3.	2309	Mastoid	"	"	Sedimenting	Very fine, white colonies. No liquefaction	"
4.	2334	Mastoid	"	"	"	Minute, grayish colonies. No liquefaction	"
5.	2118	Mastoid	"	"	"	White, small colonies. No liquefaction	"
6.	2190	Mastoid	"	"	Uniform	Minute, grayish colonies. No liquefaction	"
7.	2191	Mastoid	"	"	"	Minute, grayish colonies. No liquefaction	"
8.	2187-A	Mastoid	"	"	Sedimenting	Minute, white colonies. No liquefaction	"
9.	2187-B	Mastoid	"	"	"	Minute, grayish colonies. No liquefaction	"
10.	2231	Throat	"	"	Sedimenting on 2nd day	White, small colonies. No liquefaction	"
11.	2378	Mastoid	"	"	Diffusely	Minute, grayish colonies. No liquefaction	"
12.	X-4	Mastoid	"	"	Sedimenting	Minute, grayish colonies. No liquefaction	"
13.	2347	Throat	"	"	"	Minute, grayish colonies. No liquefaction	"
14.	2348-A	Middle Ear	"	"	"	White, small colonies. No liquefaction	"
15.	2348-B	Middle Ear	"	"	Diffusely	Minute, grayish colonies. No liquefaction	"
16.	2394	Mastoid	"	"	Sedimenting	Minute, grayish colonies. No liquefaction	"
17.	2381	Mastoid	"	"	"	Minute, grayish colonies. No liquefaction	"

* ‡ indicates acid. — no acid.

ers d Serum	Gelatine	Litmus Milk	Soluble in Bile	Dext-rose	Lac-tose	Sac-cha-rose	Mal-tose	Man-nitol	Dext-rine	Inul
te, grayish ies. No action	No lique-faction	Acid in 3 days	—	‡*	‡	‡	‡	—	—	—
te, grayish ies. No action	"	Acid in 3 days	—	‡	‡	‡	‡	—	—	—
fine, white ies. No action	"	Acid in 5 days	—	‡	‡	‡	‡	—	—	—
te, grayish ies. No action	"	Acid in 4 days	—	‡	‡	‡	‡	—	—	—
, small es. No action	"	Acid in 4 days	—	‡	‡	‡	‡	—	‡	—
te, grayish es. No action	"	Acid in 3 days	—	‡	‡	‡	‡	—	—	—
te, grayish es. No action	"	Acid in 3 days	—	‡	‡	‡	‡	—	—	—
te, white es. No action	"	Acid in 4 days	—	‡	‡	‡	‡	—	—	—
te, grayish es. No action	"	Acid in 3 days	—	‡	‡	‡	‡	—	—	—
, small es. No action	"	Acid in 5 days	—	‡	‡	‡	‡	—	—	—
e, grayish es. No action	"	Acid in 5 days	—	‡	‡	‡	‡	—	—	—
e, grayish es. No action	"	Acid in 3 days	—	‡	‡	‡	‡	—	—	—
e, grayish es. No action	"	Acid in 4 days	—	‡	‡	‡	‡	—	—	—
, small es. No action	"	Acid in 5 days	—	‡	‡	‡	‡	—	—	—
e, grayish es. No action	"	Acid in 5 days	—	‡	‡	‡	‡	—	—	—
e, grayish es. No action	"	Acid in 3 days	—	‡	‡	‡	‡	—	—	—
e, grayish es. No action	"	Acid in 3 days	—	‡	‡	‡	‡	—	—	—

	Inuline	Salicine	Hemolysis in 2 hrs. at 37° with horse blood. Brown's 4 Technic	Limiting Hydrogen 5 on concentration in Dextrose Broth after 68 hrs. at 37° C.		CLASSIFICATION			
	—	‡	‡‡‡‡	PH	5.2	Streptococcus	Pyogenes,	Human	Type
	—	‡	‡‡‡‡	"	5.2	"	"	"	"
	—	‡	‡‡‡‡	"	5.0	"	"	"	"
	—	‡	‡‡‡‡	"	5.0	"	"	"	"
	—	‡	‡‡‡‡	"	5.4	"	"	"	"
	—	‡	‡‡‡‡	"	5.2	"	"	"	"
	—	‡	‡‡‡‡	"	5.0	"	"	"	"
	—	‡	‡‡‡‡	"	5.2	"	"	"	"
	—	‡	‡‡‡‡	"	5.2	"	"	"	"
	—	‡	‡‡‡‡	"	5.2	"	"	"	"
	—	‡	‡‡‡‡	"	5.2	"	"	"	"
	—	‡	‡‡‡‡	"	5.2	"	"	"	"
	—	‡	‡‡‡‡	"	5.2	"	"	"	"
	—	‡	‡‡‡‡	"	5.2	"	"	"	"
	—	‡	‡‡‡‡	"	4.8	"	"	"	"
	—	‡	‡‡‡‡	"	5.2	"	"	"	"

The writer is indebted to Dr. Johannes Bauer of the Department of Pathology, for the detailed study given below of seventeen strains taken at random from throats, middle ears and mastoids during the height of the epidemic.

The epidemic character of the septic sore throats, the clinical similarity of all mastoid complications and the result of this bacteriological study would seem to justify the conclusion that we have been dealing with a single type of the streptococcus pyogenes. According to the work of Avery, Dochez and Lancefield,[6] there are at least four types of the streptococcus pyogenes. Because of its inability to ferment mannite, the organism of this epidemic belongs, in all probability, to their Type S3, Type S23 or Type S84. Nichols[7] gives the sugar reactions of one hundred strains of hemolytic streptococci, all of which fermented dextrin. In this study, with the exception of Strain Number 2118, none fermented dextrin, from which we might conclude that his strains belonged to a different type or types than the one predominating here.

As further clinical evidence that we were in all probability dealing with a single type of the streptococcus hemolyticus in epidemic form, it should be stated that with the exception of two cases, there was no previous illness which might have acted as a predisposing cause. Adenoids and tonsils played no part as starting points for secondary invasions since four patients of this series and many others infected during the epidemic had had them removed. Regarding the presence of the streptococcus hemolyticus in the army, Blake[8] writes as follows:

"The epidemic character of the hemolytic streptococcus infection that has occurred in the army should be quite obvious to everyone, yet it is often disregarded in discussions upon the relation of streptococcus carriers to secondary streptococcus infections. * * * That streptococcus bronchopneumonia has occurred in the form of epidemics rather than as an endemic disease, such as pneumococcus lobar pneumonia, is clearly brought out by the fact that during the winter of 1917-18, it occurred extensively in certain camps, particularly those in the South, while many of the northern and far western camps were almost entirely free from it."

It is not unlikely that a number of the epidemics in the army started from carriers possessing pathogenic strains. These were passed directly from individual to individual or through some medium, such as milk, as was found to be the case in the Boston epidemic. Milk cannot be considered as the source of infection in Peking, as the Chinese do not drink it, and practically all foreign-

ers either boil or pasteurize it before using. While the source of infection was not determined, it is highly probable that individual contacts were responsible for the spread of the disease.

For the purpose of this report, fifteen cases have been selected, which comprise practically all of the foreign cases treated during the epidemic. Five of these patients had double mastoids, so that the total number of infections reported is twenty. A departure from the ordinary method of reporting cases has been made in order to admit of greater facility of comparison for those who wish to study them in detail.

RECORD OF CASES.

Sex, age and past history.

Case No. 1. Female, age 6. Well-nourished child who had had no previous diseases and no ear trouble. Adenoids and tonsils have not been removed.

Case No. 2. Female, age 54. Elderly woman in fair health. Had scarlet fever and typhoid as a child. Was in fair health until five years ago, when she met with an accident, receiving nose injury. Since that time has had nasal obstruction, which has seemed to increase since coming to China, one year ago. No previous ear trouble. Adenoids and tonsils have not been removed.

Case No. 3. Male, age 10. Well-nourished boy with no history of ordinary children's diseases. Has had no previous ear trouble. Two years ago, tonsils and adenoids removed.

Case No. 4. Male, age 4. Well-nourished boy, who, aside from influenza prior to present illness, has been in good health. Has been free from ordinary children's diseases. Has had no previous ear trouble. Tonsils and adenoids have not been removed.

Case No. 5 Male, age 6. Under-nourished boy who has had frequent illnesses since coming to China, two and a half years ago. One year ago, adenoids and tonsils were removed. Child has had retracted ear drums and difficulty in hearing.

Case No. 6. Male, age 5. Well-nourished boy, who aside from occasional attacks of bronchitis, has been free from the ordinary children's diseases. Has had no ear trouble. Adenoids and tonsils have not been removed.

Case No. 7. Male, age 3. Boy only fairly well developed; nourishment slightly under normal, who, except for German measles one year ago, has been in good condition. Has had no previous ear trouble. Adenoids and tonsils have not been removed.

Case No. 8. Male, age 22. Young man of rather uncertain health. Frail from early youth. Treated from time to time for extremely

high blood pressure. Had scarlet fever when seven years of age. Has had no previous ear trouble. Adenoids and tonsils have not been removed.

Case No. 9. Female, age 8. Child in good health. Has had bronchitis a number of times. No history of ordinary children's diseases. Two years ago, had otitis media, which ran a very short course. Adenoids and tonsils have been removed.

Case No. 10. Female, age 6. Child in fair health. Has had practically all diseases of childhood, including influenza. Has had no ear trouble. Adenoids and tonsils were removed one year ago.

Case No. 11. Male, age 18 months. Child in only fair health. Has had occasional attacks of bronchitis with one definite attack of bronchial pneumonia, which lasted for ten days. Has had tonsillitis. Both ears have given trouble since early winter and both had to be opened. Both were in good condition before present illness began. Adenoids and tonsils have not been removed.

Case No. 12. Female, age 26. Young woman in good health, who has had all the diseases of childhood, with one attack of otitis media. Tonsils removed two years ago. Small remnant remains on the right side.

Case No. 13. Female, age 8. Child in fair health, who has had diphtheria and scarlet fever. Has had no previous ear history. Tonsils and adenoids have not been removed.

Case No. 14. Male, age 13. Boy in good health. Has had German measles, mumps and acute tonsillitis. Has had no previous ear trouble. Tonsils and adenoids have not been removed.

Case No. 15. Female, age 25. Young woman in good health, who had practically none of the ordinary children's diseases, but subject to repeated attacks of tonsillitis. Tonsils and adenoids have not been removed.

PRESENT ILLNESS.

Case No. 1. Ten days before entering the hospital, child complained of sore throat, at which time her temperature ranged between 102° and 104°. Three days after the onset of the sore throat, she complained of pain in the right ear. The following day the ear drum burst, the discharge becoming very profuse, straw colored and of a watery consistency. The left ear was somewhat inflamed, but not bulging.

A swab was sent to the laboratory for bacteriological examination.

Case No. 2. Two weeks before entering the hospital, patient complained of severe distress in the nose. Some medicine was given for the purpose of clearing it. She thinks that in forcing the

medicine through her nose, she blew something into her left ear, for almost immediately the ear began to ache, and continued to be very painful until three days before entering the hospital, when the ear drum was opened. Following incision, there was a profuse discharge which gradually decreased, although the temperature remained somewhat elevated.

A swab was sent to the laboratory for bacteriological examination.

Case No. 3. Three days before entering the hospital, patient complained of a slight sore throat and pain in the right ear. The hearing was impaired and there was a very slight rise in temperature. One day before entering the hospital, the ear drum ruptured and a great deal of straw colored fluid escaped. The ear drum was incised to admit of better drainage.

A swab was sent to the laboratory for bacteriological examination.

Case No. 4. Two weeks before entering the hospital, child had an attack of influenza, after which the temperature subsided until the sixth day before entrance, when there was a slight daily elevation. Two days later, child complained of pain in the right ear. During all this time the leukocyte count ranged between 19,000 and 21,000. Next day, the right ear drum membrane was incised, since which time there has been a profuse watery discharge.

A swab was sent to the laboratory for bacteriological examination.

Case No. 5. Two weeks before entering the hospital, the child had what was supposed to have been German measles. For the past eight days, temperature had been running up to 101° and 102° every afternoon, but there have been no symptoms to account for it. Child has not complained of pain in the ear. Examination showed both ear drums to be bulging and, after incision, there was profuse watery discharge from both sides.

A swab was sent to the laboratory for bacteriological examination.

Case No. 6. One week before entering the hospital, child had sore throat which lasted for two days with slight elevation of temperature. At that time, he complained of a slight irritation in both ears, but it was not enough to cause his parents' concern. He was brought for treatment because of deafness. Both ear drums were bulging and, on incision, only a very small amount of thick mucus was obtained. During the night, however, both ears began running very profusely a watery discharge.

A swab was sent to the laboratory for bacteriological examination.

Case No. 7. One week before entering the hospital, patient complained of pain in the right ear, which, after being opened, discharged very freely. While the throat was red at the time of examination, there was no history of a sore throat.

A swab was sent to the laboratory for bacteriological examination.

Case No. 8. Four weeks before entering the hospital, following a slight sore throat, patient complained of pain in his right ear. The ear drum was opened by the doctor in the station, and there was a fair amount of drainage; the mastoid, however, became very painful, but after a time, improved. There continued, however, a sense of uneasiness, so the patient came to Peking for examination. The ear drum was found to be bulging and, after incision, a rather thick mucus discharge was obtained, which continued for a few hours, but later became rather thin and profuse.

A swab was sent to the laboratory for bacteriological examination.

Case No. 9. One week before entering the hospital, child complained of pain in her left ear. The mother does not think she had a sore throat at the time. Having had a previous experience with ear disease, she reported at once and the ear drum was opened within an hour and a half after the pain began. Almost immediately there was a profuse, straw-colored discharge. There had been no elevation of temperature, and there continued to be none until just before admission to the hospital.

A swab was sent to the laboratory for bacteriological examination.

Case No. 10. About ten days before entering the hospital, patient complained of a sore throat, but upon examination, it appeared to be fairly normal. There was a slight flushing of the lateral walls of the pharynx. Seven days before admission, she suddenly developed pain in the left ear, which on incision, discharged very freely.

A swab was sent to the laboratory for bacteriological examination.

Case No. 11. Child had been having ear trouble most of the winter, but one ear drum had completely healed while the other was on the point of closing. There was practically no discharge. The father became ill with what was supposed to be influenza and almost immediately the child had a similar attack. Ten days before entering the hospital, the left ear began running again with a very thin but profuse discharge. The temperature became elevated daily to 101° to 102°, with a leukocyte count of 19,900.

A swab was sent to the laboratory for bacteriological examination.

Case No. 12. One week before entering the hospital, patient had a severe coryza for two days and a slight sore throat. Two days before admission, she had pain in her right ear, which became rapidly very severe, not only in the ear, but in the mastoid process. Her doctor used warm irrigations, but the condition rapidly grew worse until yesterday morning, when the ear drum burst, giving a very profuse watery discharge. Since that time, she has

been somewhat more comfortable, but still has considerable pain in the mastoid.

Case No. 13. Following an attack of sore throat three weeks before entering the hospital, the child complained of pain in the right ear. The doctor-in-charge at the station advised the use of poultices, which succeeded in increasing the pressure to the point of rupture of the ear drum, after which there was a profuse discharge. At the same time there was a great deal of pain behind the ear, to which poultices were again applied. Five days before admission a swelling appeared behind the ear, which has steadily increased.

Case No. 14. Three days before entering the hospital, following a slight sore throat, patient complained of pain in the right ear. Within twenty-four hours the ear drum was opened and a profuse watery discharge was obtained. The blood count at this time was 12,000.

A swab was sent to the laboratory for bacteriological examination.

Case No. 15. A week before entering the hospital, patient had an attack of sore throat, which was somewhat more severe than a number of previous attacks recurring through the winter. The middle ear became painful and twenty-four hours before admission, the ear drum was opened, since which time there has been a profuse discharge. The temperature remained normal.

A swab was sent to the laboratory for bacteriological examination.

SYMPTOMS ON ADMISSION TO THE HOSPITAL.

Case No. 1. Admitted December 6, 1920. Patient complained of slight sore throat. Had no pain in middle ear or mastoid, and no pain on pressure. Had been comfortable since incision of ear drum.

Case No. 2. Admitted December 4, 1920. Patient felt a great deal of uneasiness about the head, but had no pain, either in middle ear or mastoid processes, with but slight tenderness at tip on pressure.

Case No. 3. Admitted December 11, 1920. Had fair amount of pain in right ear, which was relieved on opening of ear drum. Had no pain on firm pressure of the mastoid tip.

Case No. 4. Admitted December 17, 1920. Patient had been perfectly comfortable since opening of ear drum at his home. No subjective pain in or about the ear. No pain on firm pressure of mastoid tip.

Case No. 5. Admitted January 15, 1921. Since opening of ear drums hearing had improved on both sides. No subjective pain, either in the middle ear or in mastoid processes, and but only slight pain on firm pressure of right mastoid tip.

Case No. 6. Admitted January 19, 1921. Since opening ear drums, hearing had greatly improved. No subjective pain, either in middle ear or mastoid processes. Firm pressure over mastoid tips failed to elicit pain.

Case No. 7. Admitted March 12, 1921. Since opening ear drum, no pain in or about the ear. No tenderness on firm pressure over mastoid tip.

Case No. 8. Admitted February 21, 1921. In spite of a certain amount of uneasiness in head, which could not be localized on right side, there was no definite pain referable to ear. Firm pressure over mastoid tip failed to elicit any pain.

Case No. 9. Admitted March 11, 1921. No pain in or about ear since opening of drum. Child showed certain amount of uneasiness, but pressure over mastoid tip produced no pain.

Case No. 10. Admitted April 15, 1921. Since opening of ear drum, patient had been perfectly comfortable. No subjective pain, either in middle ear or in mastoid process. Slight pain on pressure over mastoid tip.

Case No. 11. Admitted April 18, 1921. Child was considerably run down from his recent illness, but on the whole, seemed fairly comfortable. No pain could be elicited upon firm pressure of mastoid tip.

Case No. 12. Admitted April 21, 1921. Patient admitted with great deal of pain, both in middle ear and in mastoid process. Just before operation, middle ear began discharging profusely and pain lessened perceptibly; pain and tenderness in mastoid, however, continued to be severe.

Case No. 13. Admitted May 17, 1921. Patient complained of much pain and uneasiness about the ear, with considerable pain on pressure over the mastoid processes.

Case No. 14. Admitted May 25, 1921. Since opening of middle ear, pain in and around ear had disappeared. Slight pain on pressure of mastoid tip.

Case No. 15. Admitted June 1, 1921. Since opening of ear drum, pain had completely disappeared. Firm pressure over mastoid tip failed to elicit pain.

PHYSICAL FINDINGS ON ADMISSION TO HOSPITAL.

Objective Examination of the Ears.

Case No. 1. Right ear drum opened and draining freely. Slight flushing of Shrapnell's membrane, but no drooping of canal wall. No swelling or edema behind auricle. Profuse straw-colored discharge.

Case No. 2. Rather large incision in left ear drum with extremely red edges. Remainder of ear drum not congested, with exception of Shrapnell's membrane. No sagging of canal wall. No swelling nor edema behind ear. Profuse straw-colored discharge.

Case No. 3. All landmarks of right ear drum lost, and drum showing presence of severe inflammatory process. No sagging of canal wall. No swelling nor edema behind ear. Profuse straw-colored discharge.

Case No. 4. Right ear discharging profusely. Ear drum congested, but not greatly inflamed. No sagging of canal wall. No swelling nor edema behind ear.

Case No. 5. Both middle ears had profuse straw-colored discharge. Neither drum greatly inflamed. No sagging of canal wall. No swelling nor edema behind either ear.

Case No. 6. Profuse straw-colored discharge coming from both middle ears. Ear drums not greatly inflamed. No sagging of canal wall. No swelling nor edema behind the auricles.

Case No. 7. Profuse straw-colored discharge coming from left ear. Drum showed certain amount of flushing, but no evidence of severe inflammation. No sagging of canal wall. No swelling nor edema behind ear.

Case No. 8. Profuse muco-purulent discharge coming from right middle ear. Practically no redness of ear drum except about incision. No sagging of canal wall and no swelling nor edema behind ear.

Case No. 9. Profuse straw-colored discharge coming from left ear. Considerable inflammatory reaction around both drum incisions and Shrapnell's membrane, but no sagging of canal wall. No swelling nor edema behind ear.

Case No. 10. Profuse straw-colored discharge coming from left ear. Considerable redness throughout entire drum membrane, but no sagging of canal wall. No swelling nor edema behind ear.

Case No. 11. Profuse muco-purulent discharge coming from left ear. All landmarks of drum lost. Drum showed evidence of severe inflammatory process, but no sagging of canal walls. No swelling nor edema behind ear.

Case No. 12. Straw-colored discharge coming from middle ear. Ear drum had ruptured, but place indistinguishable. Both anterior and posterior canal walls sagging. No swelling nor edema behind the ear.

Case No. 13. Profuse muco-purulent discharge from right middle ear coming through large perforation in lower posterior quad-

rant. Slight sagging of posterior canal walls. Swelling behind the ear which fluctuated.

Case No. 14. Profuse straw-colored discharge coming from right ear. Drum showed evidence of severe inflammatory process. No sagging of canal walls. No swelling nor edema behind the auricle.

Case No. 15. Profuse straw-colored discharge from right middle ear. Fair amount of inflammation about the drum-incision and in Shrapnell's membrane, but no sagging of canal walls. No swelling nor edema behind ear.

BACTERIOLOGICAL FINDINGS OF SWAB FROM CANAL.

Case No. 1. Staphylococcus and diplococcus.

Case No. 2. Staphylococcus and diplococcus.

Case No. 3. Practically pure culture, streptococcus hemolyticus.

Case No. 4. Pure culture, streptococcus hemolyticus.

Case No. 5. Streptococcus hemolyticus from the left middle ear. No growth on the plate after twenty-four hours incubation from swab of right ear.

Case No. 6. Culture from right canal positive for streptococcus hemolyticus. Culture from left ear positive for streptococcus hemolyticus.

Case No. 7. Culture positive for streptococcus hemolyticus, and Gram negative diplococcus.

Case No. 8. Positive for staphylococcus albus.

Case No. 9. Positive for staphylococcus albus.

Case No. 10. Positive for streptococcus hemolyticus.

Case No. 11. Positive for streptococcus hemolyticus.

Case No. 12. No culture made from external canal before operation.

Case No. 13. No culture made from external canal before operation.

Case No. 14. Culture from external canal gave no growth.

Case No. 15. Culture from external canal positive for streptococcus hemolyticus.

X-RAY FINDINGS.

The X-ray findings noted below are the result of stereoscopic examinations made by Dr. Paul C. Hodges.

Case No. 1. December 9, 1920. Left mastoid, pneumatic in type and clear. Some evidence of sclerosis, probably the result of a very old process. Right, mastoiditis involving all of the cells. Transverse sinus normally placed. There are some cells along the squamopetrosal junction just above the mandibular articulation which are also involved.

(A second mastoid operation was performed on this patient and, for the sake of convenience and comparison, the X-ray report of December 18, is inserted in this place. It will be noted that the left mastoid was demonstrated to have become involved.)

December 18, 1920. Left mastoid, cells completely involved. There is a dark area seen through the transverse sinus, which may be the beginning of an epidural abscess; this latter at best doubtful from X-ray standpoint. (As will be noted below, "dark area" was necrotic area over sinus.)

Case No. 2. Three X-ray reports are given, taken at intervals, as there was considerable doubt as to the desirability of operating on this patient. The drainage from the middle ear ceased and, aside from slight uneasiness on the part of the patient, she seemed to be making a recovery. These reports cover, therefore, a period of observations and indicate in part our reasons for operating.

December 3, 1920. Left mastoid, chronic mastoiditis with sclerosis of part of the cells. Right mastoid, possibly normal; more probably the site of a chronic infection with the production of cholesteatoma.

December 7, 1920. Left mastoid, the upper cells seem to be undergoing sclerosis, but those of the tip probably contain pus. There are no normal air-filled cells. The transverse sinus is seen something over half an inch posterior to the auditory canal.

Right mastoid shows signs of an old sclerosis and possibly the formation of cholesteatoma, but many of the cells, particularly in the tip, contain air. If there had been an infection on the right side, it is now entirely quiescent.

December 16, 1920. Right mastoid. Cells almost completely filled except in tip with the formation of at least one and probably several cholesteatoma. The condition strikes me as very chronic with partial sclerosis. Mastoiditis, left, involving all of the cells. I believe that operation on the left side at this time would demonstrate pus or granulation tissue.

Case No. 3. December 14, 1920. Mastoiditis, right. All of the cells involved. Left mastoid, pneumatic in type and clear.

Case No. 4. December 18, 1920. Left mastoid, pneumatic in type and apparently clear. It seems to me possible that the cells may be slightly clouded, but X-rayically it would be dangerous to say that they were not normal. Right mastoid, the two rows of cells along the petrous portion just above the auditory canal are frankly involved. Those of the body of the process and the tip are X-rayically clear.

Diagnosis: Very early mastoiditis, right.

Case No. 5. January 17, 1921. Mastoids: Right, diploic in type; all of the cells involved. The lateral sinus comes moderately far forward, its anterior portion underlying the antrum. Left, diploic in type; all of the cells involved. The transverse sinus even farther forward than on the right, so that the antrum is seen to overlie almost the centre of the lumen.

Diagnosis: Findings indicate sub-acute mastoiditis on both sides.

Case No. 6. March 12, 1921. Mastoiditis on both sides, particularly the left.

Case No. 7. March 12, 1921. Mastoiditis, as reported yesterday. Right mastoid, small pneumatic cell type. Cells clear. Left mastoid, apparently of the same time, but cells completely involved. Mastoiditis.

Case No. 8. February 21, 1921. Right mastoid, large cells, pneumatic in type, with wide distribution of cells from the mandibular articulation forward far back into the occipital region. Mastoiditis involving almost all of the cells. Left mastoid, similar in type to right, but normal.

Case No. 9. March 11, 1921. Right mastoid, pneumatic in type and clear. Left mastoid, mastoiditis involving all the cells, particularly those in the tip.

Case No. 10. April 15, 1921. Right mastoid, clear. Left mastoid, all cells obscured.

Case No. 11. April 19, 1921. Right mastoid, mastoiditis, involving all of the cells, probably with destruction of the cell walls. Left, beginning mastoiditis.

Case No. 12. April 21, 1921. Left mastoid, all cells clear. Right mastoid, pneumatic in type, with all cells obscured.

Case No. 13. May 17, 1921. Left mastoid, cells clear. Right mastoid, all cells obscured.

Case No. 14. May 25, 1921. Left mastoid, pneumatic in type and clear. Right mastoid, pneumatic in type, but all the cells, particularly those near the tip, are involved with an acute mastoiditis. The process is at a very early stage and the cells still contains some air, but the soft fleecy shadows in the cells are pathognomonic of early mastoiditis.

(Inasmuch as temperature continued, a further examination was made of the left mastoid, as indicated in the following reports on May 28.)

May 28, 1921. Examination on May 26, day after operation on the right mastoid, shows most of the cells on the right side cleared out, but with some small ones persisting, especially in the upper part. A sharp metallic shadow is seen, probably caused by the

iodoform dressing. Note also, three metallic skin clips. Left mastoid, two or three of the large tip cells show very slight evidence of involvement today which was not noticeable yesterday. Evidence not sufficient to warrant operation unless clinical symptoms persist, but mastoid should be watched. Chest, slight increase of hilus shadows, left at the level of the eighth rib, posterior, and right one interspace lower. The findings are quite common, even in children of this age. They probably have no clinical significance, but might account for abnormal clinical signs. No evidence of pneumonia. Note: stereoscopic pair not available because patient moved during second exposure.

Case No. 15. June 2, 1921. Right mastoid, mastoiditis involving all of the cells. Left mastoid, of the moderately pneumatic type, probably beginning cells involvement.

TEMPERATURE AND LEUKOCYTE COUNT ON ADMISSION.

Case No. 1. Temperature, 37.4 C.; leukocyte count, 21,100.
Case No. 2. Temperature, 38.4 C.; leukocyte count, 11,020.
Case No. 3. Temperature, 37.6 C.; leukocyte count, 11,620.
Case No. 4. Temperature, 37. C.; leukocyte count, 15,550.
Case No. 5. Temperature, 36.8 C.; leukocyte count, 13,750.
Case No. 6. Temperature, 37.2 C.; leukocyte count, 14,250.
Case No. 7. Temperature, 37. C.; leukocyte count, 13,500.
Case No. 8. Temperature, 36.6 C.; leukocyte count, 9,450.
Case No. 9. Temperature, 37. C.; leukocyte count, 11,940.
Case No. 10. Temperature, 36.6 C.; leukocyte count, 13,300.
Case No. 11. Temperature, 38.4 C.; leukocyte count, 19,900.
Case No. 12. Temperature, 38.4 C.; leukocyte count, 20,000.
Case No. 13. Temperature, 37. C.; leukocyte count, not taken.
Case No. 14. Temperature, 38.9 C.; leukocyte count, 12,000.
Case No. 15. Temperature, 36.8 C.; leukocyte count, 14,000.

FINDINGS AT OPERATION.

Case No. 1. December 9, 1920. Simple mastoid operation performed. External table of bone covering mastoid cells found in good condition. Mastoid cells partly destroyed and containing considerable free pus under pressure. Many cells contained small freshly made granular masses, which bled easily when curetted. Dura and sinus not exposed. Wound drained with iodoform gauze.

Swab from mastoid wound taken at time of operation gave a pure culture of streptococcus hemolyticus.

Case No. 2. December 16, 1920. Simple mastoid operation performed. External table of bone covering mastoid cells found to be slightly discolored, but intact. Mastoid cells completely destroyed and filled with pus and granulations. Sinus not exposed, but large

area of dura just over the tegmen antri uncovered in removal of necrotic bone. Wound drained with iodoform gauze.

Swab from wound at time of operation produced no growth at end of thirty-six hours, but second taken from wound forty-eight hours after operation gave pure culture of streptococcus hemolyticus.

Case No. 3. December 13, 1920. Simple mastoid operation performed. External table found to be normal, while cells which were pneumatic in type and very slightly destroyed, were found to be filled with pus and newly formed granular masses which bled easily when curetted. Sinus and dura not exposed. Wound drained with iodoform gauze.

Swab taken from wound at time of operation gave pure culture of streptococcus hemolyticus.

Case No. 4. December 17, 1920. Simple mastoid operation performed. Mastoid bone showed numerous small bleeding points. Cortex dark, but no places of actual necrosis. On opening, mastoid cells found to be pneumatic in type and completely filled with pus and considerable streptococcal membrane. No dura or sinus exposed. Wound drained with iodoform gauze.

Swab taken from mastoid wound at time of operation gave pure culture of streptococcus hemolyticus.

Case No. 5. January 15, 1921. Simple mastoid operation performed on both sides. Right cortex normal. Mastoid filled with pus and necrotic bone. Cells almost completely destroyed. Dura exposed in middle fossa, but sinus not exposed. Wound drained with iodoform gauze.

Left mastoid, cortex normal. Cavity contained much necrotic bone and free granulations with very little free pus. No dura or sinus exposed. Wound closed with iodoform gauze.

Swab from right mastoid wound at time of operation gave pure culture of streptococcus hemolyticus.

Swab from left mastoid wound at time of operation gave pure culture of streptococcus hemolyticus.

Case No. 6. January 19, 1921. Simple mastoid operation performed on both sides. Right, cortex soft and slightly necrotic. Cells filled with stringy mucus and pus and somewhat destroyed. No dura or sinus exposed. Wound drained with iodoform gauze.

Left side, cortex normal. Cells filled with stringy mucus and pus and partly destroyed.

Swabs taken from both mastoid wounds at time of operation negative for streptococcus hemolyticus, but found to be positive three days after the operation.

Case No. 7. March 12, 1921. Simple mastoid operation performed on left ear. External table of bone covering mastoid cells normal. Cells intact, but containing pus and granulations. No dura or sinus exposed. Wound drained with iodoform gauze.

Swab taken from left mastoid at time of operation gave pure culture of streptococcus hemolyticus.

Case No. 8. February 21, 1921. Simple mastoid operation performed on right ear. Cortex intact, but discolored. On opening, mastoid cells found to be pneumatic in type and completely filled with a muco-purulent discharge. Little granular tissue inside the cells and only slight discoloration of the larger tip cells. No sinus or dura exposed. Cavity drained with iodoform gauze.

Swab taken three days after operation gave pure culture of streptococcus hemolyticus.

Case No. 9. March 11, 1921. Simple mastoid operation performed on left ear. Table of bone covering mastoid cells found to be normal. Mastoid cells when exposed showed necrosis and were filled with pus and granulations. No dura or sinus exposed. Cavity drained with iodoform gauze.

Culture made from the mastoid cavity at time of operation showed no growth after forty-eight hours, but two days after operation, a swab taken from wound gave pure culture of streptococcus hemolyticus.

Case No. 10. April 15, 1921. Simple mastoid operation performed. External table of bone found to be normal. Mastoid cells were filled with granulations and pus. No dura or sinus exposed. Wound drained with iodoform gauze.

Swab taken from wound at time of operation gave pure culture of streptococcus hemolyticus.

Case No. 11. April 18, 1921. Simple mastoid operation performed on left ear. External table of bone somewhat discolored and showed numerous bleeding points. Mastoid cells partially broken down and filled with granulations and pus. No dura or sinus exposed. Wound drained with iodoform gauze.

Swab taken from wound at time of operation gave a pure culture of streptococcus hemolyticus.

Case No. 12. April 21, 1921. Simple mastoid operation performed on right ear. External table of bone markedly discolored with many bleeding points. Mastoid cells pneumatic in type, partially destroyed, completely filled with pus and granulations. Cavity drained with insertion of two small rubber tubes in addition to gauze strips above and below.

Swab taken from wound at time of operation gave pure culture of streptococcus hemolyticus.

Case No. 13. May 17, 1921. Simple mastoid operation performed on right ear. On opening the skin, a large amount of pus escaped. Mastoid was perforated high up over the antrum. The external table of bone was necrotic. Mastoid cells were found to be almost completely broken down and to contain pus and granulations. No sinus, but a small area of dura was exposed. Wound was packed with iodoform gauze and left wide open.

Swab taken from wound at time of operation gave pure culture for streptococcus hemolyticus.

Case No. 14. May 15, 1921. Simple mastoid operation performed on right ear. External table of bone found to be normal. Exposure of cells showed them to be pneumatic in type; partially broken down and filled with pus and granulations. No sinus or dura exposed. Wound drained by insertion of small rubber tubes with gauze strips above and below.

Swab taken from mastoid wound at time of operation gave pure culture of streptococcus hemolyticus.

Case No. 15. June 1, 1921. Simple mastoid operation performed on right ear. External table of bone normal with the exception of a small area over the lateral sinus, which proved to be a broken down cell which had almost perforated the external table. Mastoid cells found to be pneumatic in type and only partially broken down, but completely filled with granulations and pus. No sinus or dura exposed. The wound was drained with two small rubber tubes with gauze strips above and below.

Swab taken from wound at time of operation gave pure culture of streptococcus hemolyticus.

In the above table, the maximum temperature for each day is placed above and the leukocyte count below, for those days on which it was taken.

Case No. 1 continued to run a normal temperature until the eighth day after the first operation, when it rose to 39 and a second mastoid operation was performed. This will be reported below.

Case No. 10 returned home with a leukocytosis of 16,050 and continued to run a slight temperature with elevation of the leukocyte count for another ten days. It is just possible that a mild pyelitis accounted in part for the continuation of temperature and leukocytosis.

OPERATION OF A SECOND MASTOID ON THREE OF THE CASES.

Case No. 1—On the twelfth day after entering the hospital, the temperature suddenly became elevated to 39 with a leukocyte count

Chart No. 2. MAXIMUM TEMPERATURE AND LEUKOCYTE COUNT IMMEDIATELY FOLLOWING OPERATION

Days After Operation	1	2	3	4	5	6	7	8	9	10	11	12
Case 1	37.8 14,050	37.6 18,900	37.2 13,570	37.4 10,850								
Case 2	37.4	37.8	37.8	38.4	37.2							
Case 3	37.4	37.8	37.4	37.	37.8	38.	37.8 7,550					
Case 4	40.4	39.4 27,225	37.8 18,050	37.4 11,250	37.4 9,700	37.						
Case 5	37.4	37.8 11,750	37.6	37.								
Case 6	37.8	37.4	37.2 16,200	37. 13,850	37.2	37.8	37.4 10,520					
Case 7	38.2 13,500	37.	37.									
Case 8	37.2 9,450	37.	37.2									
Case 9	38.6	37.4	37.									
Case 10	38.4	37.1 18,900	37.2 16,990	37.2 17,400	36.8	37.8	37.4 16,050					
Case 11	39.4 17,500	38.8	39.2 22,400	38.2	39. 18,850	39.4	40. 24,400	37.4 20,420	38.4 19,050	37.4	37.2 17,150	37. 13,300
Case 12	38.4 13,900	38.4 10,580	38.	37.8	37.2							
Case 13	38.8	37.4	37.	37.4	37.							
Case 14	38.8 12,000	40. 13,900	39.9	39.6	40. 21,000	(First (First	Operation) Operation)					
1st Operation												
Case 14	39. 18,750	38.6 17,700	38.2 12,250	38. 12,150	38. 12,250	39. 11,090	39. 15,500	38.8 13,650	38.2	38.2 9.950	37.4	37.4 8.625
2nd Operation												
Case 15	37.6	37.8 14,400	37.6 15,425	37.6 12,250	37.4 10,500	37.2	37. 11,150					

of 15,600. There was considerable edema behind the left ear and pain on pressure. The middle ear had been dry for four days, and, inasmuch as this ear drum had been opened when there was only slight congestion, it was assumed that there was little likelihood of the mastoid being infected. At the operation, however, it was found that the process had undoubtedly progressed from the time the middle ear was inflamed, as there was complete destruction of the mastoid cells with a large area of necrotic bone covering the lateral sinus. The surface of the sinus was gray but gave no other sign of being infected. There was also a large area of necrotic bone covering the dura. The first day after operation, the temperature was 38.8 with a leukocyte count of 17,170; second day 38.2, leukocyte count 13,700; third day 38.6, leukocyte count 11,800; fourth day 38.4, leukocyte count 10,250; fifth day 38.6, leukocyte count 10,350; sixth day 38.6; and on the seventh day 40.4 with a lekocyte count of 10,000. This sudden rise of temperature which continued for a number of days caused us some concern because of the appearance of the lateral sinus at the time of the second operation. The leukocyte count of 10,000 on the same day, however, gave us a certain amount of consolation even though the child did not seem to be resting well. On the eighth day after the operation, the temperature was 40.2; on the ninth, 39, lekocyte count 9,600; on the tenth 40.2; on the eleventh 40, leukocyte count 10,650. On the thirteenth day after the operation, a positive blood culture was obtained for streptococcus hemolyticus. In the absence of an increased leukocytosis, it was felt that the presence of the streptococcus in the blood was not the cause of the elevation in the temperature and a further search was made. On the evening of the same day, the blood smear showed a malarial parasite (autumnal type). There had been no history of malaria and inasmuch as we rarely have the autumnal type in North China, this was an unusual finding. Quinin was started immediately, but the child had difficulty in retaining it. Temperature on the fourteenth day after operation, 39.4; fifteenth day 38; sixteenth day 39; seventeenth day 37.6, leukocyte count 9,600; on the eighteenth day 37.4; nineteenth day 37.4; twentieth day 38.4; twenty-first day 39; twenty-second day 38.4, leukocyte count 10,200; twenty-third day 37.4; twenty-fourth day 38.2; twenty-fifth day 37.4. Thereafter the temperature remained below 37.

Case No. 7—This child, as noted above, ran an even temperature after the first operation on the left ear for one week, when he came down with a mild case of measles. Three days after the onset of measles, the right ear became painful and had to be opened. Imme-

diately there was a very profuse straw colored discharge which continued until operation. The temperature did not go above 38 during this time, nor the leukocyte count above 9,000, probably due to the leukopenia, not unusual with measles. The operation was performed in the patient's home, so no detailed laboratory findings are recorded on the hospital record. A swab taken from the mastoid wound at the time of operation gave pure culture of streptococcus hemolyticus. After the second operation returned gradually to normal and remained so until a rather severe adenitis of the glands of the neck appeared three weeks after the operation. The temperature during this time ran between 39 and 40 for a period of one week, after which it dropped to normal.

Case No. 14—As noted above, this patient's temperature remained high after the operation on the right ear. The left ear drum had been opened the day after the first operation, and there was a slight amount of discharge but the temperature was not relieved. Further X-Ray examination (as will be noted above) showed some obstructing of the cells, which together with the clinical symptoms warranted an exploratory operation. The mastoid cells were found to be partially destroyed and filled with pus and granulations. The wound was drained by small rubber tubes with strips of gauze above and below.

Swab taken from the wound at time of this operation gave pure culture of streptococcus hemolyticus.

CULTURING OF WOUND DURING PROCESS OF HEALING.

At irregular intervals swabs were taken of the mastoid wounds to determine whether or not the streptococcus hemolyticus still prevailed. The writer regrets that this part of the study was not more systematic, but the heavy burden on the comparatively small staff in the laboratory made it impossible to make more frequent cultures. In this connection, the writer wishes to acknowledge Dr. Charles W. Young's assistance in placing the time of his assistants at our disposal for this work.

Case No. 1—On December 27, ten days after second operation, culture positive for streptococcus hemolyticus for right mastoid cavity, negative for left.

Case No. 2—On December 20, four days after the operation, and on January 3, eighteen days after operation, the culture was positive for streptococcus hemolyticus.

Case No. 3—On December 27, fifteen days after operation, and on January 4, twenty-three days after operation, culture positive for streptococcus hemolyticus.

Case No. 4. On January 3, seventeen days after operation culture positive for streptococcus hemolyticus.

Case No. 7. On March 29, four days after second operation on right mastoid, on April 2, seven days after operation, and on May 5, forty-one days after operation, right mastoid culture positive for streptococcus hemolyticus.

Case No. 8. On March 11, eighteen days after operation, and on May 24, thirty-one days after operation, culture from mastoid wound positive for streptococcus hemolyticus.

Case No. 11. On April 23, five days after operation, and April 30, twelve days after operation, culture from wound positive for streptococcus hemolyticus.

Case No. 12. On June 5, forty-four days after operation, culture positive for streptococcus hemolyticus.

POST OPERATIVE STAGES OF THE DISEASE.

Three typical post-operative stages were observed in all of these cases. They were most distinctive when the cells were drained within a few days of the onset of the disease. The first stage covered a period of from three to six days immediately following the operation. It was characterized by a profuse straw-colored discharge from the middle ear and mastoid cavity. The second stage covered a period of from one to four weeks. The thin discharge of the first stage changed with surprising rapidity into one of mucopurulent character with the mucus element predominating. The discharge was so profuse that frequently dressings had to be changed twice daily. The mucus discharge from the middle ear was especially distressing during this period. Granulations, which were only just beginning in the first stage, now became abundant. Instead of forming as solid masses with broad bases, they appeared as rather pendulous and flabby growths. It was not unusual to see polypoid masses of granulations escaping from a wound on removing the drains. The third stage covered a period of from two to ten weeks. It was characterized by a gradually lessening catarrhal mucus discharge. The granulations were less active and, in some cases, needed stimulation to bring about filling in of the cavities.

POST OPERATIVE STAGES OF DISEASE.

Case No. 1. Passed through ordinary stages as noted above. Child's resistance not high, so there was considerable retarding of the healing processes. Patient discharged thirty-seven days after second operation. Mastoids healed in one week after leaving the hospital.

Case No. 2. Passed through three stages noted above. Patient discharged thirty-five days after operation; mastoid wound healed within one week after leaving hospital.

Case No. 3. Passed through three stages as noted above. Pa-

tient discharged thirty-one days after operation; mastoid wound healed within one week after leaving hospital.

Case No. 4. Patient had a very severe first stage lasting for a week, with prolonged second and third stages, in the course of which a second mastoid was performed on the other ear. The second mastoid infected by pneumococcus, type two sub-group. Child's resistance extremely poor. After passing through second stage, there seemed to be no vitality within the wound to bring about a closure. Two months after operation, patient had severe cervical adenitis, probably as a result of extension from the tonsils which were in an inflamed state. Patient discharged thirty-six days after operation; mastoid healed at the end of five months after leaving hospital.

Case No. 5. Patient had extremely short first stage, probably due to mastoid inflammation of several days' standing before operation. Second stage rather prolonged. Considerable discharge from middle ear apparently continuing to reinfect the mastoid cavity. In this case, as in a number of others, the presence of the active process within the middle ear and the eustachian tube was probably the real reason for delayed healing. Discharge from middle ear insufficient to keep perforation open, resulting in the necessity for occasional incisions of the ear drum for relief from this accumulation. Mucus probably originated in middle ear or eustachian tube. In this particular case, the ear drums were opened as many as twelve times. Patient was discharged twenty days after operation; mastoids healed six weeks after leaving the hospital.

Case No. 6. Resembled Case No. 5 in almost every particular. Patient had been operated on after process had been going on for some time. Extremely short first stage. Prolonged second stage. Some accumulation of mucus within middle ear, necessitating frequent opening of ear drums. Patient discharged twenty-five days after operation and mastoid healed eight weeks after leaving hospital.

Case No. 7. Patient passed through typical stages following both mastoid operations, but had prolonged third stage, during which cervical glands became swollen on both sides. Second mastoid, on point of healing, became infected with Klebs Loeffler's bacillus, delaying healing for several weeks. This probably extended directly from the throat, as the child was found to be a carrier. Patient discharged to his home three days after operation on first mastoid, which healed four months after leaving the hospital.

Case No. 8. No evidence of first stage, due, probably, to the fact that patient came for operation some three weeks after onset of mastoiditis. As noted above, the mastoid cells were filled with mucus which continued to be very profuse during the entire month

of life after the operation. Just before death, however, there was a slight abatement of the discharge and a reduction in the activity of the granulations.

Case No. 9. Patient passed through typical stages. First and second stages fairly short. Third stage of healing somewhat prolonged, due, probably, to low resistance. Patient discharged eighteen days after operation; mastoid healed eight weeks after leaving the hospital.

Case No. 10. Patient passed through typical stages and was healing rapidly when she became ill with scarlet fever. Immediately there was a marked increase in the middle ear discharge and healing was delayed perhaps a month. Patient was discharged eleven days after operation; mastoid healed ten weeks after leaving the hospital.

Case No. 11. First stage extremely short. Child was progressing favorably during the normal second stage when she became ill with scarlet fever. Discharge from middle ear and mastoid immediately became very profuse and final healing delayed at least six weeks. Patient was discharged twelve days after operation and mastoid was healed four months after leaving the hospital.

Case No. 12. This patient had prolonged and severe first stage which lasted a week. Second stage normal. Third stage considerably prolonged. Granulation, which had been very profuse in the beginning, became quiescent and the wound refused to heal. Patient discharged twenty-two days after operation; mastoid healed by blood-clot method thirteen weeks after operation.

Case No. 13. Patient had no first stage, due, probably, to the fact that she was operated on at least four weeks after onset of disease. Second stage short; healing not retarded in any way. Patient discharged twelve days after operation; mastoid healed three weeks after leaving the hospital.

Case No. 14. Patient had a very short first stage for both ears. Second stage lasted four weeks, at the end of which time there was very rapid healing. Patient discharged twenty-six days after first operation; mastoid healed eight weeks after leaving the hospital.

Case No. 15. Patient passed through typical stages but with practically no discharge from middle ear beyond the sixth day, probably the only exception to the rule of a three weeks' discharge following operation. Patient discharged eight days after operation; mastoid healed nine weeks after leaving the hospital.

SUMMARY AND CONCLUSIONS.

Streptococcus hemolyticus mastoiditis is an acute inflammation of the mastoid cells from which the streptococcus hemolyticus is isolated in pure culture. Until further studies are made, it is fair to

assume that all groups of the streptococcus hemolyticus attack the mastoid cells in a characteristic manner.

ETIOLOGY.

The predisposing cause of practically all the cases reported here was an acute inflammation of the throat which, in many cases, was so slight as to pass almost unnoticed. The streptococcus hemolyticus was isolated in pure cultures from all mastoid wounds and in the absence of other demonstrable organisms may be considered to be the exciting cause of the disease.

PATHOLOGY.

The rapidity with which the mastoid cells may be destroyed is astounding. A number of mastoids of this series opened within three days after the middle ear symptoms began, showed partial or complete destruction of cells; and in one case, operated twenty-four hours after middle ear symptoms began, necrosis which stopped just short of perforation of the external table of bone. The mastoid process as a rule was filled with a bloody, serous discharge, with freely bleeding granulations in great abundance. In those cases operated upon within a few days of onset of disease, the partially destroyed cells were frequently found to be a third or half filled with a streptococcal membrane. In those cases where operation was delayed beyond the ten-day period, the bloody discharge had given way to a stringy mucus. This appearance of mucus was found to be characteristic, as will be noted under the post-operative course and treatment of the disease.

Dr. Alfred Kahn[9] has called our attention to the fact that there are clinical differences between mastoids infected with the streptococcus mucosus and hemolyticus and the pneumococcus. The "Apple Specking" which he describes in the case of streptococcus hemolyticus was not observed in this series of twenty mastoids, with the possible exception of two cases, probably because they were, almost without exception, given early operative treatment. In these two cases, an attempt was made to avoid operation and both mastoids had been involved at least two weeks before they were drained. In both cases, there were areas where the cells showed signs of healing and three or four foci in each, which gave every indication of being active processes. One such focus was immediately over the lateral sinus which, when curetted away, exposed the sinus.

Symptoms. With the exception of three cases, none had symptoms which could not have been explained by the acute otitis media. Case twelve had classical mastoid symptoms, probably due to the presence of a very large pneumatic mastoid. Cases one and thirteen both had pain and swelling, probably due to delayed operation.

With the exception of Case twelve, toxemia was not a symptom. Muecke and Grantham-Hill[10] have published a paper in "The Lancet" entitled "Symptomless Influenzal (Streptococcal) Mastoiditis," which undoubtedly describes an epidemic similar to the one in Peking.

Diagnosis. All writers agree as to the absence of definite signs pointing to mastoid disease in these cases. The rapidity with which sequelae appear in untreated cases, however, makes early diagnosis imperative. In this series, diagnosis was based on the profuse, serous discharge following incision of the ear drum membrane, the finding of the streptococcus hemolyticus in pure culture or as the predominating organism in the middle ear discharges, the moderate elevation of the leukocyte count and the obstruction of the cells as demonstrated by the X-Ray examination. In practically all cases, there was no elevation of temperature until after the cells were opened. The profuse discharge is perhaps the most remarkable sign of the disease. A large pad applied to the ear after incision of the drum becomes thoroughly saturated in a few hours. This discharge is always serous in the beginning and occasionally is tinged with blood.

It should be the practice of every otologist to examine bacteriologically all acute middle ear discharges. This is especially important when the streptococcus is suspected. Bacteriological examination of the discharge in all the above cases gave positive cultures in the great majority. In some, a pure culture was obtained, while in others, the streptococcus was found to be the predominating organism. Had repeated cultures been made of the cases in this series which gave negative results, it is fair to assume that sooner or later, a positive culture would have been obtained, inasmuch as all of them gave positive cultures after operation.

A leukocytosis ranging between 12,000 and 16,000 together with little or no rise in temperature has been characteristic. In a few cases, the count has been between 20,000 and 22,000 with again only a slight elevation in temperature. Case four presents the typical temperature and leukocyte picture. After opening the middle ear and until operation, the patient's temperature did not rise above normal, yet the leukocyte count was 15,550 on admission.

The X-Ray has been of great assistance in determining the degree of involvement. In practically all cases, it was possible for the Roentgenologist to describe fairly accurately the condition of the cells as found at operation. In two cases, the process was probably caught at too early a stage to show obstruction to the cells. Stereoscopic plates alone were used in making the diagnoses.

In only one case was there evidence of mastoid disease in the external auditory canal. Case twelve, which had a large pneumatic mastoid, showed the posterior canal wall completely collapsed.

Complications. Complications are to be expected early in the course of the disease if the mastoid cells are not opened. Lateral sinus thrombosis, brain abscess, septicemia and meningitis may appear before the surgeon has taken the patient's condition seriously. Early drainage of the mastoid reduces the danger from sinus thrombosis, septicemia and brain abscess, but to a less extent from meningitis. The only fatality in this series was from meningitis following a mastoid operation which had been drained adequately for one month. Whiting reports the case of a man who died of meningitis after the mastoid wound had completely healed. A bacteriological examination of the mastoid wounds of the above series demonstrated the fact that the streptococcus was present for days and weeks following operation. In the fatal case mentioned above, a pure culture was obtained from the mastoid wound at the onset of meningitis. The same organism caused the meningitis, though no portal of entrance to the meninges could be found in or about the ear at autopsy. Dr. Henry E. Meleney[11] is reporting on this case.

Prognosis. It is probable that a much higher percentage of these cases end fatally when the mastoid cells are not opened early. The writer attributes the absence of complications and fatalities, with the exception of the one case in this series, to prompt surgical treatment.

With the exception of possibly one case, hearing has returned to normal in all instances. This is remarkable to one who has witnessed the severity of the inflammation.

Treatment. Stoops[12] reporting on mastoiditis in Camp Pike, Arkansas, writes: "One otologist of splendid training and adequate experience became pessimistic as to the benefits of the mastoid operation and attempted to treat practically all the cases of streptococcic otitis by free paracentesis and the application of various medicaments to the external auditory canal. Some patients on whom the diagnosis of mastoiditis was certain apparently recovered and were discharged from the hospital, but so far as the writer is aware all these patients suffered a recurrence of the disease and were operated on later. However, the most noticeable result of this conservative method was an immediate and alarming increase of the cases of lateral sinus thrombosis, five cases developing the complication within a few weeks."

During the epidemic in Peking at least one foreigner and a number of Chinese refused operation and yet they recovered. At

least, they have every appearance of recovery at the end of six months. The writer would not go so far as to suggest with Stoops that all streptococcic mastoids come sooner or later to operation, but he would say that early operation and that alone can free the surgeon from grave responsibility and the constant worry of complications. If there were some means at our command by which we could determine which cases are progressing to the point of bone destruction, then it might be possible to be conservative and avoid operation in a certain number.

An attempt was made in two cases of this series to give conservative treatment. Case one had a paracentesis of the left drum on the day the right mastoid was operated, thus relieving a middle ear condition of which the child had been conscious for not over four hours. The profuse discharge gradually subsided and the middle ear gave every sign of rapid recovery. Within ten days, marked tenderness of the mastoid indicated that while the discharge had practically disappeared, there was still an active process in the cells. At operation, a large area of necrosis was found over the lateral sinus and a blood culture taken several days later was positive for streptococcus hemolyticus. A second culture was negative. It is just possible that surgical interference in this case came in the nick of time to avoid a distressing complication. Case two was disinclined to operation because of her age and was allowed to wait inasmuch as the middle ear rather rapidly cleared up and the discharge practically ceased. Finally Shrapnell's membrane again became congested, although there was no increase in the discharge, and immediate operation was advised, with the result that the cells were found entirely destroyed with the tegmen antri completely necrosed. These cases cannot help impressing one with the insidious character of the disease and the need for early surgical intervention if grave complications are to be avoided.

It is interesting in this connection to note that the conclusions of the various men covering the infection of the mastoid with the streptococcus mucosus capsulatus might serve equally well for mastoids infected with the streptococcus hemolyticus. The conclusions of Whiting Bacon and J. Morrisett Smith can be summed up by the following quotations from Smith's[13] paper:

"The symptoms are very apt to be masked, even in the presence of an extensive destruction of the mastoid process.

"One of the chief dangers is that of not recognizing the presence of the infection.

"Practically all the cases come to operation.

"Prompt recognition with early and careful surgical intervention will result in a uniformly low mortality."

The operation should have for its objective not only the complete removal of all the cell but mucous membrane of the cells as well. The most troublesome feature in the post-operative treatment is an overabundance of mucus after the first few days, from the operated wound. The writer is of the opinion that while a certain amount of this comes from the middle ear and eustachian tube, by far the most important source is the mucous membrane of cells which has not been removed.

In the earlier operations of this series, the classical opening was left at the end of the mastoid incision, with a packing of gauze strips. In the later operations, the wound was left widely open and rubber tubing was used for drainage. No attempt was made to sterilize the open cavity.

Post Operative Course and Treatment. Examination of the above record of maximum temperatures and leukocyte counts following operation will show that not only a slight daily rise in temperature but also a gradual decline in the leukocytosis is the rule. Here is a picture which is entirely different from that of the so-called ordinary mastoid infection, where the temperature drops permanently to normal and the leukocytosis disappears.

As noted above in giving a detailed account of the different cases, there are three distinct stages in the process of healing, as indicated by the character of the discharges and activity of the granulations. Final healing has varied from five weeks to five months.

The proper post-operative care is of the utmost importance. The mortality may be increased through careless management of the wounds and hearing may be considerably impaired if the ear drum is not frequently inspected and drainage obtained as long as there is an accumulation of mucus within the tympanic cavity. While a systematic and exhaustive bacteriological study was not made of the wounds, sufficient cultures were secured to emphasize the fact that the streptococcus may be present for a considerable period following the operation. In two of the above cases, pure cultures of the streptococcus hemolyticus were obtained, one at the end of thirty-one days and one at the end of forty-four days. The presence of the infecting organism for so considerable a time makes the post-operative treatment an extremely important part of the management of the disease. There can be no feeling of security from complications such as meningitis until the wound is permanently healed.

All excepting the last five cases of this series had iodoform wicks inserted at the operation for the purpose of drainage. In practically every case, these were removed at the end of from twelve to twenty-four hours because of the excessive discharge. It was also found necessary for the majority to change the dressing twice daily. It became evident early in the treatment of these cases that we were closing the wounds at operation more than was wise as incisions had to be enlarged frequently to allow sufficient drainage. This was remedied by putting in only one suture and leaving the wound rather more widely open than seemed really necessary at the time. In the last five cases, small rubber tubes were inserted at the time of the operation and continued throughout the first and second stages. They admitted of very free drainage and the writer is of the opinion that the cases in which they were used improved most rapidly.

The classical time for the healing of the middle ear after the ordinary mastoid infection is given as from six to ten days. The accumulation and discharge of mucus from the middle ear of these patients varied so much that frequently perforations closed over night and the condition known as a dry middle ear was simulated. On inspection, the tympanic membranes were usually found to be bulging and, following paracentesis, the discharge continued for a variable period. In some cases, repeated incisions had to be made every few days until healing took place.

During the second stage in practically all the cases, the granulations were profuse and frequently interfered with drainage. At first these exuberant growths were snipped off with the scissors, but after concluding that a rise of temperature in one patient could be explained by these manipulations, this practice was discontinued, and fifty per cent silver nitrate was used for the cauterization. Whiting suggests that the granulations in cases of streptococcus mastoiditis should always be cauterized and never cut. One must assume following the cultural experiments noted above that the granulations are constantly bathed in a medium which is fairly well inoculated with a virulent organism and that nothing should be done to provide a portal of entrance to the blood stream or perivascular lymph spaces.

The writer has been at a loss to explain the inactivity of the granulations during the third stage. It may be the natural sequel of a severe inflammatory process. While in some of the cases, the cavities have been small enough with wound edges sufficiently approximated to employ Hammond's boric acid method of closure, others have presented large cavities which gave no signs of healing except-

ing as extremely unsightly post-aural depressions. Fifty per cent silver nitrate was used in an attempt to stimulate the granulations, but with very little success. All but one of these sluggish cases responded to what may be called the blood-clot and boric acid method. The margins of the wound were elevated and brought as near together as possible without the use of an anesthetic and the cavity was allowed to fill with blood obtained either from this manipulation or by curetting the inactive granulations. The incision and presenting clot were then covered with a generous amount of boric acid powder and the dressing applied. In one case, this treatment proved to be successful on the first attempt, but with the others, it had to be repeated three or more times. It should be understood that neither the Hammond nor the blood-clot boric acid method should be used as long as there are active streptococci in the wound. In the one case which failed to close after using the above methods, a general anesthetic was administered and the cavity curetted and closed following Blake's blood-clot method.

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THROMBOSIS OF THE SUPERIOR PETROSAL SINUS AND MENINGITIS FOLLOWING ACUTE MASTOIDITIS.*

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Meningitis and thrombosis of the venous sinuses of the dura are two of the complications which occasionally follow acute otitis media and mastoiditis. It is rather uncommon, however, for both of these complications to occur in the same case, and it is still more uncommon for them to produce a clinical picture suggesting a localized brain abscess, and yet to present at necropsy no gross connection between the original lesion and either of its complications. It is because of these unusual features that the following case is reported.

CASE REPORT.

Mr. H., aged 22, American missionary, was admitted to the Peking Union Medical College Hospital three weeks after having had his right ear drum opened for an acute otitis media. Purulent discharge from the middle ear had persisted intermittently until the time of admission. Roentgen-ray examination showed clouding of the right mastoid cells. Culture of the pus from the auditory canal at the time of admission yielded only staphylococcus albus. Temperature, pulse and respiration were normal. There was a history of scarlet fever in childhood and a recent systolic blood pressure of 200 mm. Hg. On admission, blood pressure was systolic 148, diastolic 112. Heart was enlarged to both left and right, radial artery was thickened, urine was normal. White blood cells were 9,450 per c.mm.

A simple mastoidectomy was performed, removing granulations and inflammed bone from the right mastoid cells. Culture from the mastoid cells at the time of operation was sterile, but three days later the discharge from the operative wound yielded hemolytic streptococcus in pure culture. Patient was discharged from the hospital seventeen days after operation, still having a slight discharge from the operative wound, but otherwise apparently well.

*From the Department of Pathology, Peking Union Medical College, Peking, China. The case reported in this paper is Case No. 8 of the series of cases of Streptococcus Hemolyticus Mastoiditis from the Peking Union Medical College, reported by Dunlap.[1]

Three days later he developed a severe headache localized to the left temple and was readmitted to the hospital. The mastoid operative wound was still draining, and the discharge yielded hemolytic streptococcus in pure culture. Headache was somewhat relieved by shrinking the turbinates. The next day he had a blotchy erythematous eruption over his neck and chest, his face was slightly swollen on the right side and was flushed. His neck was not rigid. Temperature was 38.5° C., white blood cells 10,950, polymorphonuclear leucocytes 61 per cent. On the fourth day after admission his headache became general and herpes labialis appeared. On the seventh day after admission the right eyelid became slightly swollen and he complained of pain in the right eyeball. Eye grounds were normal. There was slight pain on flexion of the neck, but no definite stiffness. Spinal fluid was under increased pressure, and contained 14,600 cells per cubic millimeter, mostly polymorphonuclear leucocytes. No micro-organisms were found in direct smear or on culture of the spinal fluid. On the tenth day after admission the right pupil was larger than the left and there was a right internal strabismus. Coma developed. A subdural abscess in the right temporal region was suspected, on account of which the skull was trephined above the right ear, but exploration revealed nothing. The patient died that night.

Necropsy was performed 14 hours after death. On removing the calvarium there was no excess of subdural fluid, but the brain pressed tightly against the dura. A pipette inserted into the right lateral ventricle obtained abundant cloudy yellow fluid, which, on culture, yielded hemolytic streptococci. The sulci of the cerebral cortex were shallow on account of the internal pressure, and they contained yellow purulent fluid, most abundant on the upper and lateral surfaces of the brain. At the base there was practically no exudate, except between the cerebellum and medulla, where there was thick greenish-yellow pus. No abscess was found either within or outside the brain. After fixation, the brain was sectioned and showed nothing grossly abnormal except congestion of the blood vessels and dilatation of the ventricles by cloudy fluid.

The blood sinuses of the dura were all normal except the right superior petrosal sinus, which contained a thrombus beginning at about its middle and extending mesially nearly to the cavernous sinus. It practically occluded the sinus, but was adherent only to the portion of the sinus adjacent to the temporal bone. At its lateral end, it was organized and gray in color; in its mesial portion

it was red and friable. Microscopically, the organized portion was continuous with the sinus wall, and contained only a small area of fibrin. The unorganized portion contained many polymorphonuclear leucocytes, small groups of gram-positive diplococci, and much necrotic fibrin.

There was no gross opening from either the middle ear or the mastoid cells into the oranial cavity. The tegmen tympani was intact. The tympanic antrum was large and was connected by a large opening with the unhealed mastoid operative wound. The right middle ear contained only granulation tissue. The left middle ear and antrum, and the accessory sinuses of the skull were normal. The spinal cord was congested and surrounded by cloudy fluid, but there was no purulent exudate about it. The visceral organs were normal except for a mild degree of general arteriosclerosis, slight hypertrophy of the left side of the heart with thickening of the mitral valve, and cloudy swelling of the liver and kidneys. Culture of the heart's blood yielded hemolytic streptococcus and baccillus coli.

COMMENT.

This case is illustrative of three facts which should be kept in mind by the clinician in dealing with the cerebral complications of acute mastoiditis.

The first of these facts is that no gross connection between the middle ear or mastoid cells on the one hand, and the dural sinuses or the cranial cavity on the other, need occur in order to produce a serious complication in either of these locations. The tympanic cavity and antrum send small emissary veins into the superior petrosal sinus, and the lymphatics of these cavities are also connected with the walls of the blood sinuses and indirectly with the meninges. The meningitis in this case was probably produced by lymptatic extension of the infection. Whether the sinus thrombosis was of lymphatic or venous origin is more difficult to determine, but the fact that the oldest (most proximal and organized) portion of the thrombus was apparently sterile, suggests that it was not a continuation of a septic thrombus in a tributary vein, but was possibly started by an inflammation of the sinus wall borne from the middle ear or antrum by the lymphatics. Micro-organisms may have been introduced into the propagated distal portion of the thrombus, either from the original source of the thrombus, or from the blood stream itself. The general bacteriema, which was

revealed at necropsy, may have arisen either from this septic thrombus or from the inflammed meninges by way of some other blood vessel.

The second feature of the case, which is clinically important, is the long period of time between the subsidence of the acute inflammation of the middle ear and mastoid, and the development of the signs of meningitis. The case demonstrates that no cause of acute mastoiditis or otitis media is free from the possibility of serious complication until the inflammatory process has entirely subsided, even if that be several weeks after the acute period of the disease. This is particularly true of cases in which the infecting organism is the hemolytic streptococcus. Dunlap[1] has called attention to this fact in connection with the frequent persistence of this organism in the discharge from mastoid operative wounds for many weeks after operation.

The third fact of clinical importance brought out by this case is that symptoms and physical signs, which are usually indicative of brain abscess may be simulated by some other lesion, which is apparently quite insignificant. The thrombosis of the superior petrosal sinus, which was discovered at necropsy, appears by itself to have very little relation to the clinical symptoms, but an analysis of the physical signs which so suggestive of an abscess beneath the temporal lobe, shows their possible relation to the sinus thrombosis. Nine days before death, the right side of the face was swollen and red. Three days before death, the right eyelid became swollen and there was pain in the right eyeball. On the day of death the right pupil was larger than the left and there was right internal strabismus. These physical signs are related to lesions of the third, fifth and sixth cranial nerves. Lesion of the third nerve causes paralysis of the constrictor pupillae muscle and therefore dilatation of the pupil. Lesion of the sixth nerve causes paralysis of the external rectus muscle and therefor internal strabismus. The ciliary branch of the ophthalmic division of the fifth nerve might also by reflex action cause vasomotor disturbances in the region supplied by it, and thus produce redness and swelling of the face and eyelid. Except for the paralysis of the external rectus muscle, which is the only possible evidence of lesion of the small sixth cranial nerve, the above physical signs are of the type which would be produced by a very slight injury or irritation of the nerves involved, not by complete loss of their function. In the present case the thrombosed portion of the superior petrosal sinus was in close

proximity to these three nerves. It was directly above and close to the Gasserian ganglion of the fifth nerve. The third nerve passed on the mesial side of it and the sixth nerve below and mesial to it. It is, therefore, possible that the same inflammatory process which caused the thrombosis of the superior petrosal sinus, also existed about these nerves, and interfered with their function without producing a demonstrable local lesion in the bone or meninges.

SUMMARY.

1. A case is described in which meningitis terminated an apparently convalescent case of acute otitis media and mastoiditis.

2. At necropsy a partly organized, partly septic thrombus was found in the superior petrosal sinus adjacent to the involved tympanic cavity, but no direct connection was found between the primary infection and either the thrombosis or the meningitis.

3. No case of otitis media or mastoiditis is free from the possibility of cerebral complication until it is entirely healed.

4. It is suggested that the physical signs which were interpreted as those of brain abscess were possibly due to irritation of the cranial nerves which lay close to the inflammed region, and that this irritation was caused by the same inflammatory process which produced the thrombosis of the superior petrosal sinus.

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THE BASAL METABOLISM IN HYPERESTHETIC RHINITIS, BRONCHIAL ASTHMA AND IN CASES IN WHICH THE ROENTGEN RAY OR RADIUM HAS BEEN APPLIED TO TONSILS.

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The estimation of Basal Metabolism in a few diseases, especially thyroid conditions, is today a very important procedure and in fact every year its application in a larger group of diseases has been found of some aid, especially is this so in conditions in which the etiological factors are not well understood.

Before beginning a description of the Basal Metabolism in these conditions, it seems to me I should say that when I began this work, six months ago, that the writer was not familiar with the work of Novak on the Basal Metabolism in Hyperesthetic Rhinitis. Under this name Novak grouped hay-fever, both spring and fall types, vasomotor rhinitis, and hyperplastic ethmoiditis. It seems to me it is well to also include bronchial asthma and those nasal conditions in which there is sneezing, a watery discharge, et cetera, in which food and other proteins are etiological factors.

The Basal Metabolism estimations in this work were all made by competent observers with the Sanborn-Benedict and Jones apparatus.

THE BASAL METABOLISM IN HAY-FEVER.

In my short series of hay-fever cases there were two of the spring type which were positive to the timothy pollen extract. These cases were observed for several weeks and the pollen extract was used in each case with marked beneficial results. The Basal Metabolic estimation was made and was found to be within the normal limits in each case. Eight cases of the fall type were observed, all being treated to some extent with ragweed pollen extract with varying results.

The cases which received the immunizing treatment beginning several weeks previous to the hay-fever season were more relieved than those starting treatment after the hay-fever season began.

Metabolism estimation was made at the height of the disease and each case was within the normal limits.

THE BASAL METABOLISM IN VASOMOTOR RHINITIS.

A few cases of vasomotor rhinitis were tested for their metabolism and their rate was found to be within the normal limits.

THE BASAL METABOLISM IN HYPERPLASTIC ETHMOIDITIS.

Five cases of hyperplastic ethmoiditis were observed for several months and were treated, operated and their Basal Metabolic rate taken. It has been known for a long time that in some cases of hyperplastic type that thyroid extract has promptly relieved the symptoms and it was thought possible that in these cases of hyperplastic ethmoiditis that the metabolic index might vary from the normal, but in each case it was normal with one exception, which will be noted later.

Novak describes a type C as follows: "The disease occurs most commonly in young females, although it is also observed in older women, and also in the male. The attacks come on regardless of the season of the year, without exposure to perfumes, odors or irritating vapors. They usually occur in the morning, after arising, and are characterized by paroxysms of sneezing, which has been referred to as the machine gun sneeze. The patient sneezes from a half dozen to fifty times in one paroxysm. This is followed by a profuse, thin, watery, serous, irritating discharge from the nose, soiling several handkerchiefs. The conjunctivae become more or less suffused and hyperemic. There may be only one attack. In the severe cases the attack may be repeated many times during the day. In the milder cases the disease may be only mildly annoying to the patient. In the severe cases the disease may lead to profound mental depression of the patient, and be the source of a great deal of worry. This mental state of the patient is of interest to us and is perhaps of considerable significance and importance in the study of this condition. These attacks may continue for weeks and then subside, and again they may, with annoying persistence, last for many years.

"The nose, upon examination between attacks, appears practically normal except for the pallor of the mucosa. During the attack and for a variable length of time afterward, the turbinates and the mucous membrane lining the septum are water-logged. The tissues are pale, soft and swollen. The thin serous discharge gives them a shiny appearance.

"One grain of thyroid extract three times a day has in certain cases led to a most abrupt and dramatic cessation of symptoms. The withdrawal of the thyroid therapy has brought about a recurrence of the old symptoms."

The writer can only partially verify the work of Novak. One case of a young woman with a metabolic rate slightly below the normal was given the thyroid tablets with cessation of symptoms. The thyroid tablets were withheld and the symptoms again returned as the metabolic rate decreased.

A few cases of hypothyroidism were studied, but only in the one case above cited were there any symptoms referred to the respiratory tract.

THE BASAL METABOLISM IN BRONCHIAL ASTHMA AND SOME FORMS OF FOOD ANAPHYLAXIS.

A few cases of bronchial asthma and cases of food anaphylaxis with the usual symptoms were studied. E. Zugsmith and M. Kahn state that asthmatic individuals seem to suffer from tissue suboxidation; therefore, a decrease of tissue breakdown during dyspnoea. In the cases which were observed by me the metabolic index was within the normal limits.

THE BASAL METABOLISM IN CASES IN WHICH THE ROENTGEN RAY OR RADIUM WAS APPLIED TO THE TONSILS.

On taking up the study of Basal Metabolism in cases in which the tonsils had been subjected to the Roentgen Ray or Radium, the writer tried to carry out the work without forming any opinion whatever till the work was finished.

The time of observation of the cases to which the Roentgen Ray or Radium was applied varied from six weeks to six months.

A great many functions have been ascribed to the tonsils, most of which are difficult if not impossible to prove. Whether the tonsil at any time of life acts as a gland of internal secretion or at any time of life has any effect on the Basal Metabolism has probably not been definitely settled. It is hardly probable that anyone today suspects that the tonsils at any time in life have any such effect on the Metabolism as the thyroid gland, but whether a minor role is not played by the tonsil on the metabolism is not so easily decided. J. Harper says: "The tonsil represents a part at least of the original excretory organ from the second branchial groove. An excretory organ which no longer excretes becomes either an internal secretory gland or a lymphatic gland and that the tonsil is a lymphatic gland." It has been suggested that the tonsil is an excretory gland whose function is yet unknown.

An internal secretion similar to that of the superarenal has been ascribed to the tonsil. G. B. Wood says that the tonsil is important to the welfare of the body as far as the production of the lympho-

cytes is concerned and is only valuable at such time in life when the function is not properly cared for by other organs.

It semed to me at the beginning of this work that the chronic infection in tonsils could change the Metabolic Rate and that by the application of the Roentgen Ray or of Radium that this index might have been brought within the normal limits.

In this time of so much surgery of the tonsils any procedure which might throw light on any phase of the tonsil question should be interesting therefore, this work has been carried out.

THE BASAL METABOLISM IN CASES IN WHICH THE ROENTGEN RAY WAS APPLIED TO THE TONSILS.

The cases on which the Roentgen Ray was used were of ages from seven to sixty years and of both sexes. Five of these were boys of ages from sevent to thirteen. The Basal Metabolism was estimated before and at intervals after the use of the Roentgen Ray. A total white blood count was made before the use of the Roentgen Ray and at intervals during the observation. Cultures of the crypts of the tonsils, and appearance of the tonsils, pillars, with drawings and the condition of the crypts, glands, et cetera, were noted previous to the application of the Roentgen Ray and notes made every few days during the observation. The above procedure was carried out in all cases before the application of the Roentgen Ray or the Radium.

The Roentgen Ray dosage in the first seven cases was as follows: Milliamperage 4, Gap 7 inches, Distance 18 inches, Time 6 minutes.

In the five boys previously mentioned, the pillars, size, and color of tonsils, et cetera changed very little if any after the Roentgen Ray. The blood count probably was not changed at all by the application of the Roentgen Ray. Special attention was paid to the lymphocyte count but only the normal variations were noted.

The Basal Metabolism was estimated at several different sittings and at each estimation was not changed by the application of the Roentgen Ray.

The tonsils were removed in these five boys and the laboratory report is as follows: In culturing tonsils after removal the following technique was employed; the specimen was received in sterile pietri dish. The capsule incised with sterile knife, the surface of the capsule being previously seared over with hot iron. Attempt was made to avoid crypts. The culture made directly from the parenchyma. Note; cultures before and after treatment show about the usual bacterial flora, streptococcus of hemolyzing and viridans

and pneumococcus types, et cetera. Sections show for the most part the usual hyperplasia of lymphoid and fibrous structures as a chronic inflammatory reaction.

The adults were given the same dosage of Roentgen Ray as noted above on two successive days, cultures made, blood examinations and the Metabolic Rate estimated before and after the application of the Roentgen Ray and for several weks thereafter, with the following results: Bacterial flora was not changed even though the cultures were made at intervals for several weeks after the use of the Roentgen Ray and the tonsils were finally removed and the culture showed the same growth as previous to the use of the Roentgen Ray and histologically the tonsils showed only moderate decrease in the parenchyma. The Basal Metabolism was within the normal limits each examination.

Five adults of ages from nineteen to sixty years were subjected to the following Roentgen Ray dosage each week for three or four weeks: Milliamperage 5, Gap 9 1-2 inches, distance 10 inches, time 8 minutes, with a filtration of 5 milliameters of aluminum. The one case which was sixty years old had acute cryptic abscesses after the third treatment. This case as far as the treatment with the Roentgen Ray goes was very unsatisfactory.

The Basal Metabolism was estimated, cultures of the tonsils, blood examinations, et cetera were made previous to the Roentgen Ray and at intervals after its application.

The Metabolic Rate was practically the same at each examination. The bacterial growth was not changed by the Roentgen Ray, neither was the leukocyte count appreciably altered.

THE BASAL METABOLISM IN CASES IN WHICH RADIUM HAS BEEN APPLIED TO THE TONSILS.

Five cases, all adults were studied. The first step in the observation was the estimation of the Basal Metabolism and then the size and appearance of the tonsils with its secretion was noted, cuts, et cetera of the tonsils being made.

Cultures of the crypts and the blood counts were made in each case previous to the application of the Radium.

Fifty milliagrams of Radium were applied externally over the tonsil for four hours and fifty milliagrams with a special applicator were applied to the surface of the tonsil one week later for two hours and again fifty milliagrams were applied externally for four hours after an interval of another week. In one case the application in the mouth produced a slight burn lasting ten days.

The Metabolic Rate was estimated at intervals during the observation and only slight variation in the rate was noted and all were within the normal limits.

Cultures of the tonsils before and after the use of Radium showed the usual flora of the tonsils, pneumococci, streptococci, et cetera. Cultures were made from the crypts several times during the observation and at each examination the bacterial growth was practically not changed. In two cases the tonsils were removed and cultures were made through a seared surface through the capsule and these cultures showed the same bacterial flora as previous to the application of the Radium.

The histological findings were the same as in the usual hypertrophied tonsils with possibly a slight decrease in the parenchymatous tissue.

CONCLUSIONS IN HYPERESTHETIC RHINITIS.

1. Most cases of hyperesthetic rhinitis and bronchial asthma have a normal metabolic rate.
2. A very few cases of hyperesthetic rhinitis have a low metabolic rate and are relieved by the administration of thyroid extract.
3. Most cases of hypothyroidism have no special respiratory tract symptoms.

IN CASES IN WHICH THE ROENTGEN RAY HAS BEEN APPLIED TO THE TONSILS.

1. The Basal Metabolism is not altered by the application of the Roentgen ray.
2. The tonsil has little if anything to do with the metabolism of the body.
3. The bacterial flora of the tonsil is little if any changed by the Roentgen ray.
4. The histological structure especially the parenchyma of the tonsil is decreased but not eradicated by the Roentgen ray.

IN CASES IN WHICH RADIUM HAS BEEN APPLIED TO THE TONSILS.

1. The same conclusion can be drawn it seems to me after the application of Radium to the tonsils as after the application of the Roentgen ray.

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Exchange Building.

LATERAL SINUS THROMBOSIS.

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The aspects of this thesis which will be touched upon might well include:

1. The anatomic relation of the lateral sinus.
2. The pathologic sequences leading to its infection and subsequent thrombosis of its contained blood-stream.
3. Symptomatology of (a) lateral sinus phlebitis; (b) thrombosis.
4. Differential diagnosis.
5. Prognosis.
6. Medical and surgical management.

Anatomic Relations. That part of the temporal bone, most concerned in the events preceding and leading up to lateral sinus thrombosis, will be found to be in very intimate anatomic relationship with two of the great systemic anatomic divisions, viz: (1) the vascular system, and (2) the central nervous system—with the former this discussion is for the moment most concerned, and it will be seen that the tympanic cavity and mastoid process, in addition to the blood supply directly concerned with nutrition, is in close anatomic relation to major vessels of both the arterial and venous type.

Furthermore, very direct and intimate intercommunication may be demonstrated, both for the venous and the arterial systems with the vascular network within the walls of these cavities. It is this close proximity and intimate intercommunication that furnish the physical anatomic status leading to and making probable extension of the infective processes from the temporal bone to these adjacent important vascular structures.

Inasmuch as the natural current of the blood and its serum is from the arterial system to the tympanic cavity from the latter to the venous channels, one would naturally expect pathologic processes of a septic character to pass into the venous channels rather than into the arterial. That this is not the only way, however, is demonstrated by cases recently reported by Bowers (Am. Society of Laryngology, Otology and Rhinology), in which the internal carotid artery was involved through the tympanic cavity, with fatal hemorrhage.

This, however, is a rare occurrence, and far more frequently the venous channels become involved in the septic process.

The anatomic relationship of the lateral sinus with the temporal bone becomes intimate at the knee of the sinus, continues throughout the whole course of the sigmoid portion, and includes also the jugular bulb.

Throughout the whole course of the vessel covered by the above mentioned divisions the walls of the vessel lie in close proximity to the bone forming the lateral sinus groove, its walls forming the periosteum of that part of the temporal bone, and so coming into intimate vascular relationship with the blood supply of the whole mastoid process.

Thus is clearly established the anatomic vascular pathway through which may travel sepsis within the mastoid and tympanic cavity on its way to the great vascular channels involved in lateral sinus thrombosis.

The jugular bulb is in the same close anatomic relationship with the floor of the tympanic cavity.

One should not leave the anatomic phase of this subject, without at least referring to the many anatomic variations both in the matter of the position of the lateral sinus groove in its relation to the mastoid cells, and also as of equal importance the variations in the cells themselves, covering the wide difference between a vastly developed mastoid of the pneumatic type, through the diploic type to one in which pneumatization has never started or has been early stayed in its progress.

These various types of mastoid structure have a distinct bearing on the probability of the incidence of this complication in a given case of acute or chronic mastoiditis. The influence of the anatomic type of the mastoid on the course of the infection is only secondary to the varieties of the bacteriologic finding in these cases.

Pathological Sequences. In every case of infection of the mucous membrane lining the tympanic cavity, the mastoid antrum and adjacent mastoid cells are more or less involved. As the process proceeds, the underlying bone becomes involved, and then to a simple mucous membrane infection is added an infective osteitis, which if not controlled by natural processes or relieved by medical or surgical procedures, progresses over an ever widening and deepening area, until finally the internal surfaces of the inner plate are involved and the way has been blazed for extra temporal bone complications of various types.

There are different ways in which this extension may take place, and they should be clearly understood and sharply differentiated, because, according to which type is present will depend the early or late incidence of vascular intracranial complications.

(a) The septic inflammatory process may, in the first place, proceed by a rapidly widening area of involvement, without the formation of a protective process limiting the advance of the infection. In this type, there is little effort to throw up a limiting protective plastic area around the area of infection, and the process proceeds rapidly with open venous channels, which quickly carry the infection to outlying areas.

In this type, the inner surface of the bone is quickly reached without the intervening osseous area having undergone any great amount of caries or necrosis, so that an infection of the walls of the venous channels takes place without macroscopic evidence of bone destruction, furnishing the type of lateral sinus thrombosis occurring in acute tympanomastoiditis.

(b) On the other hand, there is that type of septic process characterized by the throwing up of a barrier to the progress of the infection which more or less effectually limits its onward course.

In this type, thrombosis takes place in the venules of the bone involved in the protective area, cutting off its nutrition, but limiting the progress of the infection, then instead of a rapidly widening area of infection with intact bony structure, as in the former process, in this type the nutrition of the bone suffers, caries takes place and the picture of a breached internal plate, with perhaps an extradural abscess, is presented.

Many times an exposed but non-infected sinus is thus found.

Furthermore, in chronic suppurative otitis media with much caries in the mastoid, the dura over the sinus is quite frequently found exposed and covered with granulations over a wide area, the sinus remaining healthy.

These are cases which, in the primary destructive bone processes, were of that type in which the onward progress of the infection has been stayed by the thrombosis in the venules of the bone, and the force of the infection spent on the bone tissue itself, the spread to the soft tissues further on having been checked by the venous bone thrombosis.

In such a case the status of an original acute mastoid disease is brought about by a secondary infection which now might easily extend to the vein, causing phlebitis and subsequent thrombosis of its contents.

The picture one must carry of the events leading to a thrombosis of the blood in the vessel must, in its early stages, be that of a phlebitis, an infection of the tissues making up the walls of the vein, the inner lining at first remaining intact and the contained blood passing on uninfected.

Then comes a breach in the inner lining of the vessel, a slowing of the onrushing blood at that point with the formation of a coagulum, which quickly becomes infected and the picture of a beginning thrombosis is before us, the way opened for the general bacteremia which gives the characteristic symptoms so universally accepted and recognized.

The coagulum which is now infected, gradually grows and spreads until a mural clot is formed, and as long as blood finds its way past the clot to continue into the general circulation the characteristic symptoms may continue, the onrushing blood detaching particles of the infected clot. When, however, the whole lumen of the vessel is occluded by a solid clot, these symptoms may not again recur until such time as the clot again undergoes liquefaction and is once more thrown into the general circulation.

One hears sometimes of an uninfected thrombosis, which condition is open to some doubt, in view of the experiments made by Dr. Angus McLean, many years ago, in which he showed that a breach of the inner wall of a vein, even accompanied by the introduction of a current staying substance into the current of blood flowing through the vein, was not followed by clotting of the mobile blood in the vessel, so long as the area was sterile and free from infection.

It must not be forgotten that a sinus thrombosis may occur at various points in the course of the vessel, the most usual being through the mastoid, in which the favorite place for it to have its inception is at the knee, or just below it,—the next most common place being farther along the course of the sigmoid, above the bulb, but on the other hand the route may not be through the mastoid at all, but through the floor of the tympanic cavity directly into the jugular bulb. Dehiscence in the tympanic floor would favor such a course, and it is furthermore more likely to occur in children than in adults.

SYMPTOMATOLOGY.

(a) *Lateral Sinus Phlebitis.* When an infection of the air spaces in the temporal bone is progressing favorably, the establishing of free drainage through a perforation of the tympanic membrane is followed by an immediate and permanent improvement in all the symptoms; pain ceases, tenderness becomes less or disappears, fever is absent or not over 99 or 100, pulse but little elevated, the patient feels well, and the tongue is not coated, the blood picture is but little changed from the normal. When phlebitis takes place, the above is reversed in a moderate degree, and frequently an undue tenderness is found at the angle of the jaw and there may also be found at the point a few enlarged glands. However, the patient

does not seem very ill, and an exact diagnosis cannot be made, but merely suspected.

The tenderness at the angle of the jaw and enlarged glands are things very difficult of exact demonstration, especially in a sick, fretful and violently objecting child. Nevertheless, one must always suspect such a condition under the above mentioned symptomatology, and early radical surgical intervention, which should include free drum incision and complete mastoid exenteration, may prevent an impending thrombosis.

(b) *Lateral Sinus Thrombosis.* The outstanding thing in many cases of lateral sinus thrombosis is that in the early days of the inception of the process the patient does not appear to be very ill, and this is true even after the characteristic symptomatology of chills, high temperature, sweats and sudden drop in the temperature to normal or below—the pyemic symptomcomplex—has become established. Between the violent excursions of temperature the patient feels comparatively well.

Nevertheless, the tongue is always coated, the appetite capricious, and the blood picture shows a leucocytosis around 17000.

When to these symptoms is added a positive blood culture, the diagnosis may be said to be complete and incontrovertible. The symptomatology of lateral sinus thrombosis would be a very clear-cut and unmistakable thing if it were not for the fact that many such cases are accompanied by other intracranial lesions such as meningitis, brain abscess and extradural abscess, which many times perceptibly cloud the issue. The question of blood culture is one which, when positive, is very important, but when negative does not mean much for the reason that in the intervals between the exacerbation the bacteriocidal properties of the blood may effectually destroy the bacteria. The most likely time for the demonstration of a positive blood culture is at the height of the temperature curve, and furthermore the nearer to the source of the infection the blood is taken the more likely it is to show a bacteremia.

DIFFERENTIAL DIAGNOSIS.

It must not be forgotten that many systemic complications may elevate the temperature and pulse and give a clinical picture simulating that furnished by a lateral sinus thrombosis; thus, an obstructed tympanic drainage will simulate such a complication. Follicular tonsillitis must not be forgotten. Pneumonia must be excluded.

A situation which certainly taxes the ingenuity and resourcefulness of the auradiagnostician is presented by the necessity of telling upon which side the sinus thrombosis may lie, in a case of double

tympanomastoid infection with clean cut sinus thrombosis symptomatology either before or after a double mastoid operation has been done. The following considerations are offered as being of value in rightly interpreting this puzzling situation:

(a) Anatomically the right sinus is so situated in relation to the mastoid cells as to render it more liable to infection than the left in the proportion of 3 to 2.

(b) The time of incidence of the original infection has some weight, the older the process the more likely the complication.

(c) X-ray findings, showing variation in type of anatomic development of the two sides, the position of the lateral sinus and the extent of the mastoid cell disintegration.

(d) The difference of tenderness and gland involvement at the angle of the jaw, of but little value in children.

(e) When the sinus is completely occluded, compression of the jugular vein on the opposite side will cause increased fullness of the retinal veins as observed by the ophthalmoscope; of value only when the sinus is completely occluded, and then not easy of demonstration.

(f) The character and extent of the bony sepsis as observed at the time of the original double mastoid operation.

All of the above considerations may yet, and indeed frequently do, leave one still in doubt, and one must resort to

(g) Exposure of both lateral sinus from above the knee to as near the bulb as one can get, and through a critical examination of each vessel by touch one can see in the walls or on them—by palpation—by obstruction of the flow high up and subsequently refilling or not of the vessel when the pressure is released.

(h) A procedure suggested to the writer by Professor R. B. Canfield, of the University of Michigan, as follows: After a thorough exposure of both vessels as above, a sterile hollow needle attached to a syringe is introduced through the walls of the sinus as low down as possible and the point pushed into the jugular bulb; the contents are then withdrawn into the syringe and the product from each side examined and compared.

The correct diagnosis of which side harbors the thrombosis is, of course, of the very highest importance, because one side only may be operated, and if that be the wrong one the mistake is irreparable.

(i) The former ear history of the case is extremely important, because, other things being equal, the side which has formerly been infected once or many times, or is the seat of a chronic suppurative

otitis media, is far more likely to furnish a lateral sinus thrombosis than one infected for the first time.

In this communication I purpose making two brief case reports, only because they both bear upon this important, interesting, and ever puzzling situation.

Case I. B. H., a female child, age 6, developed a double tympanic abscess first in right ear, and 36 hours later in left. Both ears received early aid from drum incisions, and active medicinal treatment. Both mastoids went on to the second degree, and a double thorough simple mastoid operation was done fifteen days after the original tympanic infection. History free of former ear disease.

The temperature which, previous to the double mastoid operation, was high and capricious, was not influenced favorably by the surgical procedure.

A diagnosis of lateral sinus thrombosis was made very definitely. Upon which side was the thrombosis? This interesting question was solved correctly only when both sinus were completely exposed. In the wall of the left sinus was found a yellow spot which looked like pus in the wall of the vein. However, when the right one was likewise exposed, a far more advanced pathology was revealed. A large area of the wall of the sinus was found indurated and covered by a well-developed gramilomata one-half inch in extent.

This side was selected on the basis of the more advanced macroscopic pathology presented, the jugular tied, sinus packed, off, and opened. The recovery, from this on, was uninterrupted.

Case II. Need not be reported in detail, because it was an exact replica of Case No. 1, with, however, this very important difference. The history of the case showed that the child, 18 months before, had had a right-sided tympano-mastoid infection following scarlet fever, which had passed on into a chronic suppurative otitis media. Both sinus were exposed and the right one selected for jugular ligation and excision of the sinus contents. Again the recovery was prompt, and complete.

Gastrointestinal disturbances in children frequently bring about a similar train of symptoms. A septic thrombosis of some other venous channel in the body would give a closely allied symptomatology, and one of the most puzzling complications, especially in children, is pyelitis, which furnishes just such temperature and pulse excursion as are found in sinus thrombosis.

However, every one and all of these conditions are capable of being differentiated definitely, especially with the aid of an internist and pediatrician. This, however, I have to say—that as one swallow, or even two, does not make a summer, so one or even two vio-

lent excursions of temperature do not establish a diagnosis of lateral sinus thrombosis, and one should feel that it is a condition which does not demand precipitate action, but furnishes plenty of time for careful, thoughtful investigation and painstaking differential diagnosis.

Prognosis. Of all the intracranial complications, save extradural abscess, sinus thrombosis, early recognized and dealt with in a comprehensive surgical fashion, offers the best possible prognosis.

Dench, from his statistics, has a mortality following the operation of 28 per cent, but states that many of those cases died from complicating diseases such as meningitis and brain abscess. So one might safely say that in uncomplicated cases, dealt with early and thoroughly, the mortality would be a very creditable chapter in surgery.

Medical and Surgical Treatment. But little time need be consumed in discussing the treatment of lateral sinus thrombosis, for, once the diagnosis is established, the management of the local situation is a purely surgical problem as far as the sinus thrombosis is concerned.

The sinus must be widely and thoroughly exposed above beyond the thrombosed area and below as near the bulb as may be, packed off and thoroughly opened.

So far, all may be said to be agreed, but the same unanimity of opinion is not found when one searches for the attitude of aural surgeons upon the management of the jugular vein in the neck.

My own opinion, based upon a fairly long and what might be said to be a reasonably wide experience, is that by all means the jugular vein should be ligated in the neck and resected above the facial vein, and that it should be done as the initial procedure in the operative technique, and before the sinus is opened, but after it is exposed.

In my cases, the prompt, complete and satisfactory recoveries have followed this technique.

Cases of pyemia following simple opening of the sinus and turning out of the clot, without dealing with the jugular, have been my experience.

Some very few cases of undoubted lateral sinus thrombosis have recovered without any surgical interference, in which cases my impression is that benefit has followed the heroic use of streptolitic serum, but such experiences are so woefully few that they should not be allowed to cloud the issue, which should always be viewed as a purely surgical proposition.

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A REPORT OF TWO CASES OF HEAD INJURY, WITH ABNORMAL OTO-NEUROLOGICAL FINDINGS.*

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I am presenting these two cases for the reason that as far as I have perused the literature, I do not find cases of head injury and symptoms referable to the ears in which complete examinations of the auditory and static-kinetic labyrinths have been made. Neither have I found reported in the literature cases of head injury with symptoms referable to the ears, who have died as the result of the injury wherein the brain in addition to the auditory apparatus was examined histologically for the purpose of co-relating the symptoms with the pathological findings. Sidney Scott, in March 1916, reported a case of bullet wound of the vertex, causing his death. A blood clot was found in both middle ears, his labyrinth was perfectly normal on histological examination and no fracture of the base of the skull was found. Before death the patient was quite deaf in both ears and prolonged bone conduction was found on both sides. Brun, in 1913, stated that disturbances of hearing occurred in 14 per cent of skull injuries and 24 per cent of basal fractures. Stenger, in 1909, found that hemorrhages in the round window and lower coil of the cochlea were found in rats after a blow on the head. When the blow was severe the cochlea showed blood extravasations and hemorrhages into the cochlear nerve. Lange and Linck in 1909 found in autopsies of individuals recently injured that occasionally the auditory nerve was torn through and the crura of the stapes was torn away. Barnick, in 1897, showed that when the labyrinth capsule is injured there is marked destruction of and hemorrhages into the inner ear.

J. Gordon Wilson, in a very comprehensive article entitled, "The Effects of High Explosives on the Ear," discusses the subject of deafness combined with vertigo as the result of shell fire in recent cases and in those seen some time after the injury. In the recent cases he states that he never has observed nystagmus although all complained of vertigo. However, other objective signs of vertigo, such as pointing error and other signs of unstable equilibrium were demonstrable and quickly passed off. There did not seem to be any

*Read before the Section on Otology, New York Academy of Medicine, Dec. 9, 1921.

relation between the return of the hearing and the disappearance of the vertigo. Of eighteen men carefully examined for vertigo, twelve gave distinct histories and signs of labyrinthine vertigo, and the other six had no objective signs of vertigo. A petrous bone, from a casualty who was found to be completely deaf before death, was examined histologically and showed definite evidences of damage to the cochlea in the form of edema, exudations and hemorrhages, while no pathological change was found in the semicircular canals.

It is more than possible that the material upon which the above paper was written was not entirely cases of simple shell shock. Some of the men might have fallen into shell holes and been covered by debris. Sand bags, fragments of shells, or building material might have fallen on or struck their heads in addition to the expansive and detonating force of explosions. In this way it is quite possible that many cases with injury to the central nervous system due to direct trauma to the head might have been examined. Certainly the vertigo and other signs of instability could not be attributed to injury of the end-organ alone, unless the function of the semicircular canals and cochlea were completely destroyed. In this instance very severe symptoms of vertigo, vomiting, falling and demonstrable nystagmus would have been manifest, but were not observed in any case.

Dr. Wilson states in his Harvey lecture, 1917-1919, "In many the probability of internal injury to the nervous system must be considered." Mott reports two cases of commotio cerebri without external injury in which the brains were autopsied. A condensed pathological report is herewith given, viz., the veins throughout the brain and meninges are congested. There are scattered subpial hemorrhages of microscopic size almost everywhere due to rupture of the dilated veins. There is a generalized early chromatolytic changes in the cells of the central nervous system. The cells most affected are small cells in which the basophile substance has partly or totally disappeared. In the larger cells the Nissl granules are smaller and not packed so closely together as normal. The small cells of the medulla and pons are slightly swollen and the nuclei are large and clear. In the corpus callosum, internal capsule, pons and medulla are seen congested veins and hemorrhages into the sheaths of these vessels with occasional extravasation of blood corpuscles into the adjacent tissues.

It is likely that comparable pathological conditions as reported by Mott, resulting from the effect of high explosives may occur in the

patients who have suffered a severe blow on the head and thus explain in a great measure the abnormal findings as exemplified in the two cases that are herein reported.

C. A. Aged 58 years. Machinist. March 18, 1921. Born in Russia. Family and previous history have no relation to present illness. Chief complaints. Deafness in the right ear and dizziness.

Present history. On Dec. 20, 1920, while working, a bearing of about 25 pounds weight fell on his head. He did not become unconscious and walked to the emergency hospital one and a half blocks away, supported by a fellow workman. He suffered a lacerated wound of the scalp at about the vertex and was dressed for this about one and a half months and was then operated upon for bone necrosis. For the past ten years he has worn glasses which were changed two years previous to the accident. About one and a half weeks after the accident he noticed that his right eye was weak. Immediately after the injury he experienced a roaring sound in his right ear and deafness on this side became manifest. At the same time he experienced a severe dizziness which has gradually grown better. His Wassermann reaction is negative and the condition of his eyes as reported by Dr Kaufman Schlivek is as follows: Vision in the right eye, 15/70 and the left eye, 15/20. With correction the right eye can be brought up to 15/40 and the left eye to 15/15. The pupils react promptly to light and accomodation; the sensibility of the cornea is normal. There is an incipient cataract in both eyes, right more marked than the left. There is also an old iritis in the left eye. The fundi demonstrate senile changes in the macula. The ear drums appear to be normal.

Hearing tests. Lateralizes to the left. Right ear G 48 fork negative; C 1 fork negative to both air and bone conduction; C 4 fork negative; conversation negative; Galton whistle negative. Left ear G 48 fork fifteen seconds; C 1 fork, air eighteen seconds, bone nine seconds; C 4 fork thirteen seconds; conversation twelve feet; Galton whistle, highest notes heard. No evidence of malingering could be demonstrated by the stethoscope test.

Co-ordination tests. Finger to finger test, normal; finger to nose tests, both sides not prompt. Adiadokokenesis apparent with the right hand; Romberg positive. On turning the head to the right he has a tendency to fall backward and to the right. On turning head to the left he falls backward and to the left. Pelvic girdle reactions not prompt, especially on tilting patient backward. There is no spontaneous nystagmus or past pointing.

Tests of the vestibular apparatus. The findings herein reported have been confirmed by two consecutive examinations. On turning to the right with the head in the upright position the patient developed a large horizontal nystagmus to the left lasting twenty-five seconds. He past pointed three inches to the right with his right arm and slightly to the left with his left arm; the falling was moderate. Note the abnormal past pointing with the left arm. On turning to the left with the head in the upright position he developed a small horizontal nystagmus to the right of nineteen minutes duration. He past pointed three inches to the left with the right arm and eighteen inches to the left with the left; the falling was slight.

On douching the right ear with water at sixty-eight degrees Fahrenheit with the head upright, no nystagmus occurred after three minutes and he touched with both arms. On tilting the head backward a large horizontal nystagmus to the left developed and he past pointed seven inches to the right with his right arm and touched with the left. On douching the left ear with the head in the upright position he developed a small rotary nystagmus to the right after one minute and twenty seconds. He touched with the right arm and past pointed three inches to the left with the left. With the head back he demonstrated a large horizontal nystagmus to the right and he touched with the right arm and past pointed four inches to the left with the left.

Summary. 1. History of direct injury to the head. 2. Complete deafness of right ear and vertigo directly after the injury. 3. Positive Romberg Test. 4. Poor pelvic girdle reactions. 5. Slight manifestations of inco-ordination. 6. Adiadokokenesis with the right hand. 7. Absence of response of the right vertical semicircular canals to douching. 8. Inability to pastpoint inwardly with both arms after turning and douching. 9. Tendency of the left arm to past point to the left after turning to the right.

Diagnosis. It is very apparent from the findings that this patient is suffering from an injury to his brain stem or cerebellum as the result of the tremendous force of the blow on the vertex of his skull. This conclusion is made from the following facts: First, that the hearing on the right side is entirely destroyed; second, the right static labyrinth functionates with the exception of the vertical canals. If the function of the right semi-circular canals were ablated completely in conjunction with the destruction of the hearing on that side, one would be led to conclude that the pathology was located in the right inner ear notwithstanding the fact that signs of inco-

ordination and abnormal past pointing have been elicited. It is therefore fair to conclude that the symptoms herein manifested are partly if not wholly due to synapses produced in the continuity of the nerve pathways involved, either by virtue of small hemorrhages or actual laceration of brain tissue.

The following case was examined and treated in collaboration with Dr. John James Cotter.

E. R., aged 25 years, married, carpenter, June 18, 1921. Born in United States.

Chief complaints. Dizziness, headaches and numbness of both hands and forearms.

Family and past history have no bearing on present condition.

Present history. On February 13, 1921, while working, three bricks stuck together, falling down a chute three stories at an angle of 45 degrees, hit this patient squarely in the center of the head in front of the vertex. He became unconscious and remained so for about ten minutes. When he regained consciousness he was lying supine and said that although he was looking upward he could see all of the things which were lying along side of him, swimming around above him. In about thirty minutes he again became unconscious and then found himself in the hospital. He again became unconscious and did not awake until the next morning. One week after the injury he tried to get out of bed and fell forward on the floor due to what he called lightheadedness. While lying in bed he noticed that he was dizzy and nauseated, even though he remained perfectly quiet and much worse on turning in bed. This was so bad that he vomited his food for four days after the injury. He remained in the hospital two weeks; the vertigo of which he complains is much improved but it has not as yet disappeared.

He had a laceration of the scalp two and a half inches wide and three inches long; the scar of which is evident upon inspection.

His pupils react sluggishly to accommodation and promptly to light. Consensual reflex, prompt. Adiadokokenesis suggestive with the right hand. Finger to nose and finger to finger tests show no definite variation from the normal. He has no spontaneous nystagmus. The Romberg is positive. The pelvic girdle reactions not prompt especially on pushing to the right and backwards. He past points spontaneously with his right arm three and a half inches to the right. Ear drums appear to be normal.

Hearing tests. Lateralizes to the right. Right ear,—G 48 fork thirteen seconds, C 1 fork, air ten seconds, bone seven seconds; C 4

fork, eleven seconds; Galton whistle, hears highest tones, conversation, thirty feet; whispered voice, two and a half feet. Left ear, G 48 fork, eight and a half seconds; C 1 fork, air eighteen seconds, bone five seconds, C 4 fork, ten seconds; Galton whistle, highest tones heard; conversation forty feet; whispered voice, twenty-five feet.

Tests of the vestibular apparatus. The following has been confirmed by two complete examinations. On turning to the right with the head upright he developed a medium-sized rotary nystagmus to the left of twenty-five seconds duration and past pointed with his left arm five inches to the right and four inches to the left with the left arm. Vertigo continued to the right and was of ten seconds duration. The falling was moderate. On turning to the left, he developed a medium-sized horizontal nystagmus to the right of twenty-nine seconds duration. He touched with the right arm and past pointed twelve inches to the left with the left; in this instance the past pointing was prolonged beyond the normal time. The vertigo was of ten seconds duration and in the normal direction. The falling was marked.

On douching the right ear with water at 68 degrees Fahrenheit with the head upright no nystagmus occurred after two minutes and twenty-five seconds. He touched with the right arm and past pointed twelve inches to the left with the left. With the head tilted backward a small horizontal nystagmus to the left developed and he touched with the right arm and past pointed eight inches to the left with the left. On douching the left ear with the head upright he developed a small rotary nystagmus to the right after two minutes and thirty seconds and past pointed markedly to the left with the left. He fell markedly to the left. With the head tilted backward a horizontal nystagmus to the right of moderate amplitude developed and he past pointed two inches to the left with the right arm and twelve inches to the left with the left arm.

Particular notice should be made of the abnormal reactions which were elicited, i. e., rotary nystagmus after turning the patient to the right with the horizontal semicircular canals in the horizontal plane. This was confirmed three times. Past pointing to the left with the left arm after rotation to the right. On testing the duration of the patient's vertigo after turning to the right, he felt that he was still turning to the right after the chair was stopped. The absence of past pointing with the right arm after turning to the left, and the prolonged past pointing with the left arm. He demonstrated an absence

of nystagmus after douching the right ear with the horizontal semicircular canals in the horizontal plane and the absence of past pointing with the right arm and the past pointing of the left arm markedly to the left after douching the right ear. The past pointing of the right arm markedly to the right after douching the left ear.

November 18, 1921, about nine months after his injury, this patient was again interrogated and examined and he says that his memory is not as good as it was before the accident; he becomes dizzy on bending forward and does not feel safe when looking down great heights. His accuracy with his right arm is nowhere that which it used to be, the muscles of which remain sore for a few days after a hard day's work. His judgment appertaining to his work is not as good as it was and his ability to calculate arithmetic, geometry and algebra, which is essential in his work as a boss carpenter, does not come with as great facility as was formerly possible for him to do. The result of the examination is about the same as that which was found previously, with the following exceptions: that his pupils react promptly to accomodation, that there is no evidence of adiadokokenesis, that the hearing acuity of his right ear has diminished to conversational voice, and to the higher tones of the Galton whistle. With the eyes closed he falls backward and to the right with his head in any position. On rotation to the left he past points twelve inches to the right with his right arm. On douching the right ear with the head upright he past points one foot to the right with the right arm and with the head backward he past points eight inches to the left with the left arm. On douching the left ear with the head upright no nystagmus occurs after two minutes and thirty seconds.

Diagnosis. The patient received his injury on February 13, 1921, and was examined by us on June 18, 1921. On that date he showed all the evidences, as above demonstrated, of an injury to his head producing vertigo, abnormal past pointing, stimulation of the right vertical semicircular canals did not produce nystagmus, no tangible reduction in hearing, positive Romberg, poor pelvic girdle reactions especially when pushed backward and to the right. The tendency to fall occurred always backward and to the right, no matter in which position the head was placed. He was again examined on November 18, 1921, at which time in addition to what was found at the first examination, he showed very definite evidence of a reduction in his hearing on the right side and stimulation of the left vertical semicircular canals did not produce nystagmus. In view

of these findings, it is impossible to come to any other conclusion than that this patient is suffering from an injury to his brain stem or cerebellum or both, which in the process of healing, the scar tissue which formed, involved additional nerve tissue as suggested by the result of the examination on November 18, 1921.

Cases of this nature come before the various compensation commissions for adjudication because they usually occur in individuals working in hazardous occupations. The patients are very often ridiculed and told to go back to work when they complain of vertigo and instability, as happened to one of the cases herein reported. It is probably not entirely the fault of the physicians on the staff of the various compensation commissions. The subject is as yet in its developmental stage and its reliability and accuracy are not admitted by all neurologists. There must be innumerable cases of the kind as reported here, but there are few, if any, similar records with which the physicians, passing judgment on these patients, may have a precedent upon which they may base their opinions.

Recovery from injuries of this character is slow if it occurs at all. The various compensatory factors, such as sight, joint-muscle sense, tactile and static-kinetic sense help in a great measure to compensate for the instability and allow the patient to resume his occupation without great discomfort or danger to himself.

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THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON RHINOLOGY AND LARYNGOLOGY.

April 26, 1922.

Descending Retro-Pharyngeal Abscess, Etc. Dr. Otto Glogau (two cases).

Presentation to the Section on Laryngology by Dr. Lee M. Hurd, Photograph of the late Dr. George M. Leffert's Clinic at Columbia University. Also of Interiors of Clinic by Dr. D. B. Delavan.

Partial Rhinoplasty with (a) Cartilage Implants (3 cases); (b) Temporal Pedicled Forehead Flap (2 cases), Illustrated by Lantern Slides. Dr. Clarence A. McWilliams, Dr. W. V. Healey (by invitation), Dr. Henry S. Dunning.

The first case was a woman, 24 years of age, who had been four years cured of lupus of the nose and face. She was treated at the Skin and Cancer Hospital. She came to Dr. McWilliams with the nose almost entirely gone, as shown by a picture, and begged for relief. Dr. McWilliams presented the young woman before the surgical society and asked for advice, and an artificial nose was suggested, which the patient refused. Then, with Dr. Dunning's assistance, Dr. McWilliams performed an operation which he demonstrated with a model, resulting in an excellent nose.

The second patient had a traumatic saddle nose seven years ago. In repairing this defect, Dr. McWilliams transplanted the cartilage in the nose through a transverse incision, restoring a normal appearing profile. The cartilage could be distinctly felt in place.

The third patient had had a luetic nose with all the cartilage gone. Two and a half years ago cartilage was transplanted, with a result that was so satisfactory to the patient that he refused a further plastic operation which Dr. McWilliams wished to do to improve it.

The cartilage was still present in the nose in all these cases and Gillies and others claim that it is permanent and that they had never seen it disappear.

The next case was presented by Dr. Dunning. The patient had had an epithelioma of nose which had been removed by the actual cautery and afterward treated with radium. The patient did have a columella, and did have a cartilage, but the operative procedure was practically the same as shown by Dr. McWilliams. Dr. Dunning and Dr. Healey performed this operation, putting a Thiersch graft under the pedicle, etc., as Dr. McWilliams had demonstrated.

Pictures were shown illustrating the various stages of the temporal pedicled flap method of procedure. The flap is taken in the hair, which is subsequently removed by the X-rays. It is the method of choice in plastics of nose, cheeks, lips and chin.

A New Surgical Procedure for Relief of Depression of the Nasal Bridge and Columella: Its Application for the Correction of Hump and Deflected Noses. Lantern Slide Demonstration of Plastic Surgery of Face and Neck. Dr. J. Eastman Sheehan.

Published in September, 1922, issue of THE LARYNGOSCOPE.

Tuborrhea of the Right Ear, Impaired Hearing of the Left Ear, and Polyarthritis Due to Purulent Sinusitis. Dr. George D. Wolff (by invitation).

DISCUSSION OF PLASTIC SURGERY.

Dr. Sheehan said he was pleased to learn that Dr. McWilliams' experience with the use of chrondal cartilage was in line with his own. I do not agree with Dr. McWilliams using a temporal artery flap of scalp.

It is not a good match for the normal nasal covering; what its final coloring will be, time alone will be the most trenchant critic. I feel the use of a temporal artery forehead flap is the most rational procedure to repair the loss. The scarring is not very noticeable, after due course, especially in women, as they have many novel ways of fixing their hair over the forehead. The part of the flap which is not utilized, in covering the loss, is of course returned to the forehead. If the loss of skin of the forehead is extensive and after the wound is approximated as much as possible, the gap can be nicely filled in with a Thiersch graft or a full thickness graft taken from behind the ear, or from the back or the right leg. In the repair of the soft tissues of the lower jaw and lip in man, the use of the scalp is ideal, as this gives him a beard and a mustach if he cares for one. The picture which Dr. McWilliams showed of the war case, Dr. Sheehan had helped to repair. He had seen this patient last summer and the large gap of the forehead which had been filled in with a full thickness graft, was hardly noticeable, surely not at a distance.

As for the Italian method, there is no excuse for any operator today using this method. It is a painful and uncomfortable procedure. If skin is taken from the forearm it makes a poor match; if the finger is utilized it not only makes a poor match for the normal nasal covering, but it gives a poor contour. Besides the patient loses the finger. Patients have been known to commit suicide by using this method. Sudden death from embolism has also occurred. A temporal artery flap of forehead skin causes very little pain, if any, with the minimum of danger to the patient.

DR. SHEEHAN congratulated Drs. McWilliams and Dunning upon the success of their efforts. Plastic surgery is very difficult work, which requires one to be well skilled in the fine art of surgery and to possess a peculiar temperament.

Patience is the watchword and time is the operator's greatest ally and many times his most trenchant critic. I feel it a great privilege for me to be here tonight and see the wonderful work which has been accomplished by these gentlemen. It matches some of the best results which he had seen in this country.

DR. CARTER said he had been very much interested in the rhinoplasty patients shown by Dr. Dunning. Referring to the flap for a complete rhinoplasty, he said that he has used the flap from the forehead chiefly. He utilizes the angular artery for the nutrition of the flap. He emphasized the importance of making a pattern of the place to be covered. A method which Dr. Carter had devised a number of years ago and which he had used with great satisfaction was to cut out of paper the proper pattern for the case; a duplicate of this was made of adhesive plaster and fastened in the proper position on the forehead; the incision being made around this, great accuracy in flap-cutting was secured. He always made liberal allowance for contraction. In some cases it has not been necessary to do any skin-grafting at all over the denuded area on the forehead, as Dr. Carter elevates the tissues for a considerable distance over the forehead and head and gradually pulls the edges together with adhesive plaster.

Dr. Carter said that he was interested to know that Dr. McWilliams was still employing the incision between the eyes for introducing the transplant. Although he (Dr. Carter) had advised that method himself, he had abandoned it several years ago in favor of the intra-nasal incision, which gave better results, the chief advantages being that the drainage was at the lowest point and no scar was visible. He still uses the conjoined bone and cartilage transplant and finds that when bone is properly transplanted it is never absorbed. Today he had seen a case where he had transplanted bone nine years ago; Dr. Law had made an X-ray plate showing that the bone graft was in healthy condition and had grown considerably. It was firmly attached to the frontal bone. The use of bone Dr. Carter regards as indispensable in some cases. Bone withstands infection fairly well; in several instances he has been able to control the infection and save the graft. Dr. Hurd had just told him that he had had several cases infected in which he had saved the bone transplant.

Cartilage does not establish a firm bony union with the frontal, but always remains movable to a certain extent, and it does not grow as bone does. This growth, however, occurs only to the extent of satisfying the functional demands of the part; Dr. Carter has never noted an overgrowth of the bone transplant. Bone is more difficult to transplant than cartilage and requires more experience to handle it successfully, but the large number of cases of many years' standing which Dr. Carter has, fully demonstrate the efficiency and permanency of bone in the correction of nasal deformities.

DR. FORBES said that after seeing these cases and pictures of the work done, especially that of Dr. McWilliams and Dr. Sheehan, he was more than ever impressed with the fact that the great success of plastic work lies in the correctness of detail. If every one doing plastic work would give the time to the study of the cases and to the study of the technique he might hope to get the results that Dr. Sheehan was securing. That was doubtless his idea in presenting these cases tonight, and he certainly was to be congratulated on the results of the study and application that he had devoted to this subject both here and abroad.

DR. SHEEHAN said that there was no need for further remarks.

We tell you of our experience with the use of cartilage and whether you use cartilage or bone, you must decide for yourself. The leaders in the work who have acquired their skill from war cases, have given up the use of bone and have substituted chrondal cartilage. I only need mention such men as Gillies, Killner of England and Ferris Smith of Grand Rapids, Michigan.

DR. CARTER replied that when statements concerning the transplantation of bone were made which were at variance with well known clinical facts, he would like to see such statements backed up by proof drawn from personal clinical experience and not by vague references to what other men were saying or doing.

Dr. Carter said that the large number of post-operative cases he had brought before the Section and the numerous X-ray plates of bone and cartilage transplants taken by Dr. F. M. Law at varying intervals after operation during the past fifteen years fully demonstrated the value and permanency of bone when properly transplanted into the nose for the correction of depressed deformities.

Dr. Carter felt that while war surgery was all right for the development of a good many things, it had added nothing to our knowledge of the growth of bone and its fate in the tissues when used as an autogeneous transplant. Bone is a tissue slow in its metabolic processes and repeated observations extending over a considerable period of time are essential in order to reach accurate conclusions. These matters, with the aid of Dr. Law as radiographer, had been thoroughly worked out and demonstrated before the Section long before the war.

Dr. Carter said that he was still using both bone and cartilage in his work and he was convinced that a good many men of experience were using bone as well as cartilage.

Dr. Sheehan rejoined that he was fearful lest this might be construed as being a personal matter. Far from it. This was a scientific paper, delivered in a scientific manner, before a body of scientific gentlemen, and I feel you will all agree with me, should be conducted by each one in a scientific way. He had the greatest regard for the work of Dr. Carter, who says he has been working in this field of surgical endeavor for the past fifteen years. I am quite sure Dr. Carter had spoken as he did, because he had personally obtained these remarkable results, but the men who had large experience in this work during and after the war, have given up the use of bone; that cartilage, once it takes, always remained as transplanted, whereas bone in many cases is absorbed. He could only cite his own experience and that of his associates.

Dr. Carter replied that the fate of the transplant was a matter of great importance and that if Dr. Sheehan wished to establish his claim that bone was absorbed, he should, if he has had any personal experience in this work, be able to present the clinical evidence to sustain the assertion.

Dr. Carter has had so many cases of successful bone transplantation during the past fifteen years, many of which have been exhibited before

the Section, together with the X-ray plates taken by Dr. F. M. Law, that the question of the viability and permanent quality of the bone transplant can no longer be raised.

THE CHAIRMAN (Dr. Macpherson) said that all knew of the work that Dr. Carter had done and that he had photographs to show that the bone did live. It was a relative matter. Cartilage also lived, and that one could be used to the exclusion of the other in all cases was probably not what was intended to be implied.

Carcinoma of the Larynx, Treated by Radium and Operation. Dr. Sidney Yankauer.

(a) This patient was presented last year. The patient was first treated with radium intra-laryngeally and externally, and after the tumor was reduced in size by the radium the growth was excised under suspension laryngoscopy. The patient now presented an almost perfect larynx and a good voice.

(b) This patient had had a squamous epithelioma of the vocal cord. Had this been excised by the method employed before the use of radium, the patient would have lost his voice. Under radium treatment, the tumor disappeared entirely macroscopically, so that no trace of it could be seen with the laryngeal mirror. After this was accomplished, the portion of the cord which had contained the tumor was excised under suspension laryngoscopy, and a remnant of carcinoma was found in the center of the excised cord. The pathologist stated that it consisted of dead carcinoma cells. Only a portion of the cord was excised, so that when healing took place the patient had an almost perfect larynx and a perfectly good voice.

The method employed for the intra-laryngeal application of radium consisted of a tube inserted in the larynx, in the interior of which was a small brass capsule containing the radium. This apparatus was inserted in place by the aid of certain measurements, so that the tube was exactly opposite the growth. The entire apparatus was left in the cocainized larynx for four hours, during which time, if the patient occasionally had a little dyspnea, he was relieved by aspiration with the suction pump or a little oxygen was supplied through the side opening.

DR. MACPHERSON said that there were not many cases of carcinoma of the larynx treated by radium that presented the same results shown by Dr. Yankauer.

DR. MICHAELIS said that an effort should be made to evaluate the results obtained by radium or by surgical interference. Dr. Yankauer, in both cases presented, claimed much credit for radium in the supposed cures and gave a great deal of importance to the future of radium in these cases; but he also stated that the patients had considerable surgical interference.

The first of the cases presented consulted him a year ago and was operated upon in his office by the indirect method and all visible growth removed. Examination of specimen confirmed the diagnosis of carcinoma. It often happens that these patients, when they learn of their condition, want to see other doctors, and so this man consulted different men and finally turned up under Dr. Yankauer's able hands.

The question now arises, since he has had a considerable amount of growth removed, how much is the radium responsible for the apparent cure and how much the surgical interference. Many cases of strictly localized intralaryngeal carcinoma have not done well with radium.

Dr. Michaelis said that he had seen a number of cases of this kind in the last year or two which he had referred to the Memorial Hospital for radium treatment, but he felt constrained to say, after following them up, that the results were not good. Several had returned distinctly worse in a short time. Whether this is due to over dosage or stimulation of the growth to increased activity he could not say, but they did not do well and some had to be tracheotomized.

Is the radium responsible for these apparent cures or is the surgery? In both of these cases the growth was strictly intralaryngeal. There was no involvement of the glands of the neck. It seems reasonable to con-

clude that the radium played a very small role in the cases and that the surgery was largely responsible for the apparent cure.

DR. YANKAUER said that the role played by radium in this case was an important one. In the first place, the tumor was considerably shrunken in size; not only that, but the consistency of the tumor was changed, so that the carcinoma was more distinctly outlined from the surrounding healthy tissue, so that the tumor could almost be shelled out, it was so different in consistency.

In the second case, the tumor had completely disappeared macroscopically, and in the excision of the vocal cord he had had to depend on his memory as to where it had been. In both cases the tumor was so much reduced in size that the amount of surgery was very much less than would otherwise have been necessary.

DR. FORBES remarked that Dr. McTiernan had stated that he had never seen a case as clean as this. He had himself, however, thought he saw a granuloma still present, located positively on left, and would not by any means say that the case was clean, in the sense of showing no evidence of a laryngeal condition.

Dr. Yankauer said that the growth was in the narrow part of the larynx, on the vocal cord, and the excision was naturally limited to the part involved by the growth. He would watch the case and hoped to be able to present it again before the Section, for it was very important not to lose sight of these cases.

Primary Epithelioma of the Antrum of Highmore. Dr. William W. Carter. New York City.

This was a case of epitheliom of undoubted origin within the Antrum of Highmore; such cases are very rare.

The patient, a man sixty years of age, was admitted to Gouverneur Hospital on January 23, 1922.

Family and previous history good. Wassermann negative.

Chief complaint lancinating pains in right upper jaw and side of the face for the past four weeks. Had a first upper molar on right side extracted. This did not relieve him and there was a continuous discharge of sero-pus from this tooth socket up to the time he presented himself for treatment.

Examination: Right side of the face slightly swollen, but not painful to the touch.

Nose, slight congestion of the turbinates and increased secretion on the right side.

Mouth, all teeth missing from upper jaw. From socket of the right first molar protrudes a small teat-like process of granulation tissue; from this spot there is a discharge of watery pus. The odor of this is offensive. A bent silver probe can be introduced through this alveolar opening into the antrum, where it seems to meet with spongy resistance.

X-ray examination shows right antrum opaque.

Patient was etherized with the intention of doing a radical operation for empyema of the antrum.

Opening in alveolar process enlarged. Bone found very spongy and friable. Part of growth found in the antrum removed for microscopical examination.

Examination of specimen by Dr. Symmers of Bellevue Hospital and by Dr. Cotter of Gouverneur Hospital, both of whom pronounced it epitheliom with numerous microscopic abscesses scattered throughout the growth.

Operation February 12. External carotid ligated opposite the greater cornu of the hyoid bone.

February 13. Right superior maxilla was removed, Fergusson's incision being used. In severing the nasal process of the superior maxilla the Gigli saw was introduced through the nasal duct and into the nose. In severing the malar bone the saw was passed through the sphenomaxillary fissure and the bone was severed as near as possible to its attachment to the superior maxilla in order to preserve the malar prominence.

The oral cavity was packed with gauze, an incision was made with a right-angled knife along the border of the hard palate to the right of the

septum. An incision was made through the muco-periosteum of the hard palate along the middle line to a point on the alveolar process about corresponding to the former location of the right middle incisor. With a stout nasal saw the hard palate and alveolus were severed along the line of the last incision. The bone was now held only by the pterygoid process of the sphenoid and the tuberosity of the palate bone. By firmly grasping the bone with the fingers and rocking it back and forth and cutting a few soft attachments the bone was liberated and removed intact.

Hemostasis resulting from the previous ligation of the external carotid was almost complete. It would be very difficult indeed to do this operation without this preliminary procedure.

Gross Characteristics of Specimen: The bone, especially the alveolar process, was very soft and friable. No apparent bulging of the antral walls. No erosion, save at the location of the first molar. The cavity of the antrum was about half filled with the growth, which apparently had originated on its floor or outer wall. There was no evidence that the growth had extended beyond the antral walls.

The conclusion drawn from an immediate examination of the specimen was that the disease was in its very early stages.

An important consideration was to close off the nasal from the oral cavity. This was accomplished in the following manner: The muco-periosteum was elevated from the remaining well side of the hard palate and a flap was made from the mucous membrane of the cheek where this was cut near the base of the alveolar process in removing that bone. This flap was sutured to the muco-perosteum previously elevated from the hard palate and posteriorly to the soft palate which had been preserved. This made a very satisfactory palate which completely closed off the nose from the mouth, and it certainly had the appearance of a normal palate.

The suturing of the facial wound was done with horsehair, and surprisingly little deformity resulted. The periosteum of the orbit which had been preserved held the orbital contents in perfectly normal position.

The patient was removed from the operating room in excellent condition and apparently his chances for recovery were very good.

Shortly after the patient recovered from the anesthetic (ether by the intra-pharyngeal method) he became paralyzed on his right side and died about thirty-six hours after the operation either from cerebral hemorrhage or cerebral embolism. No postmortem examination was permitted. Primary *Epithelioma* of undoubted antral origin is an extremely rare disease, but both carcinoma and sarcoma of the upper jaw are fairly common. Joseph Beck of Chicago reports nineteen cases of carcinoma of the upper jaw; of these only two are now living, both of whom having been subjected to the radical operation without the use of either radium or X-rays. Beck believes that in some of his cases the fatal issue was hastened by the use of these agents.

A review of the literature since 1898 shows that all methods of treatment are unsatisfactory; the mortality is frightful.

An incomplete operation hastens the fatal termination. The use of radium both before and after a radical operation probably offers the patient the best chance for escaping death.

Dr. Lewald said that the early diagnosis of this condition could be made by X-ray studies. Usually cases come in even more advanced, in which there is actually bulging of the antrum wall, and he had been wondering whether there was anything characteristic in this instance, which had not come to the bulging stage, which would distinguish it radiographically from the mere infection of the antrum.

Dr. Carter replied that the radiograph that was taken gave an opaque plate, but it was considered at the time that it was an empyema of the antrum, and he began the operation expecting to find this condition.

Demonstration of Instrument for the Introduction of Radium Emanations Into the Oesophagus and Bronchus. Dr. Sidney Yankauer.

The apparatus consists of a long brass tube, to the outside of which is attached a hyperdermic needle. An obturator passing through the tube

is connected with another obturator passing through the needle. Connected with the obturator, and situated close to the needle, is an adjustable stop by which is determined the depth at which the radium capillary will lie. A second adjustable stop near the handle regulates the depth to which the needle is inserted into the growth.

The loaded instrument is inserted into the growth until its progress is arrested by the adjustable stop near the needle. It is held firmly in this position, the handle closed, and the instrument withdrawn. The action is as follows: instead of ejecting the capillary into the tumor, forcing it to make a passage for itself, what happens is that the needle is withdrawn from the capillary, allowing it to remain in the channel made by the needle.

This arrangement safeguards the capillary from breakage, and in addition gives the operator a sense of security and of accuracy which is much more needed when working through a long esophagoscope than when injecting growths situated near the surface of the body.

SECTION ON OTOLOGY.

May 12, 1922.

Acute Mastoiditis Associated with Acute Nephritis: Report of Three Cases. Dr. Carl M. Sautter.

DISCUSSION.

DR. LEDERMAN said he could add nothing to the report of these three very interesting cases. In the last two years it had been his experience that almost all the cultures from the surgical mastoid had been streptococcus hemolyticus. He could recall no cases where there was a complication of kidney infection, in spite of the fact that a number of these cases had been very extensively diseased, but could readily appreciate that such a condition might arise from what had just been reported. It was a very good method to have all the organs examined to eliminate any possible cause of continuous temperature. If there was a sudden rise of temperature one was very apt to think of a jugular or sinus involvement; but as one had more experience he was apt to take the entire clinical picture into consideration and make haste slowly.* He then cited two instances where he had been urged to perform a sinus operation. In one of the cases he yielded and found nothing; in the other the patient got well without an operation, and the last case had a joint involvement. It was always possible that there may be a parietal clot, and this was very difficult to decide unless the sinus was opened. Blood examination and culture will assist greatly in arriving at a definite diagnosis.

DR. HERZIG cited a case similar to those of Dr. Sautter, which occurred in 1919. The patient was a child three years of age who had an acute mastoid condition associated with acute nephritis, and streptococcus hemolyticus was found in the culture. . . . Guaiac urine. In this case he had to remove the Michel clamps on the second day. The only edema the child had was under the eyes. The only other disease worthy of mention was that the nephritic symptoms lasted six or seven months after the mastoid healed, but finally cleared up. Nitrous oxide anesthesia was given in this case for 1½ hours. The bone oozing was large in amount due to the nitrous oxide and handicapped the operator.

Further Studies of Acuity of Hearing, Etc. Dr. Guttman.

To appear in November, 1922, issue of THE LARYNGOSCOPE.

DISCUSSION.

DR. LAW, replying to another question, said that the Roentgenologist could not distinguish between fluid and granulations.

He fully agreed with Dr. Kopetsky that the interpretation of the plates should be on pathological lines. The only pathology which the X-ray would show in the mastoid is bone absorption, or bone deposit. Both

occur in the mastoid, and the interpretation should rest on the bony changes principally.

While pus and granulations produce a change in the plate, the important thing to know is whether there has been any bony change.

DR. TOUSEY inquired about the relationship between the intensity numbers on the instrument and the intensity on the chart,—No. 7.

DR. GUTTMAN replied that 7 means 7 cmt., while the scale is arbitrary, its relation to normal expressed in percentage can be easily accomplished by a simple mathematical formula.

DR. KOPETZKY said he did not know of any work so important to otologists as studies along the line that Dr. Guttman had been making. It was in line with the work presented some months earlier by Dr. Dean of Iowa City. It showed that the men were thinking seriously of the handicaps the present methods of functional diagnosis gave; and the Section was particularly fortunate in having so careful and painstaking a study presented. No one better than Dr. Guttman would welcome a full and free discussion of the subject.

DR. TOUSEY said he had a certain instrument in his office such as a Farradic battery or coil which was run by a direct electric lighting current; and each vibrator was a metallic ribbon stretched so that the tension could be varied and the rates of vibration adjusted from a low to a very high pitch. There were two ribbons, and they could be so regulated so that they did not harmonize at all, or else they could vibrate at the same rate, or in unison, or so that they formed a musical chord. It would seem that something like that, with two rates of vibration going at the same time, would give very interesting results in the hands of some one who knew enough about otology to determine the results of such an examination.

DR. LEDERMAN asked if Dr. Guttman had tried this therapeutically and had had any results from its use.

DR. GUTTMAN said that he has one or two charts representing the result of the examination of hearing power before and after the treatment, and it is quite interesting to be able to judge the result of the treatment by these charts.

Cerebellar Tumor with Autopsy Report, in Which the Labyrinthine Tests Gave Negative Results. Dr. Benjamin Rosenbluth (by invitation).

DISCUSSION.

DR. HERZIG asked how long before the exitus was the spinal fluid withdrawn for examination.

DR. ROSENBLUTH replied that it was four or five days.

DR. HERZIG asked if it was dangerous to take a spinal fluid in the case of a suspected brain neoplasm.

DR. KOPETZKY said he took the findings of Dr. Moschowitz as to the involvement of the peduncle as a fact. Here was a sarcoma of sufficient size which produced no pressure symptoms of change of eye grounds to show by indirection any impairment of the labyrinthine or labyrinth-cerebellar-cerebral tracts, and in view of the stand taken by the proponents for labyrinthine examination in intracranial lesions, it was particularly fortunate to have this exact record which was checked up by autopsy, to place in the medical literature. Explanation he could not give; he did not understand it.

DR. MYERSON inquired concerning the number of times the patient's labyrinthine function was tested, during the time of the patient's stay in the hospital. He also called attention to the fact that Dr. Rosenbluth mentioned that the attacks of severe pain were intermittent. It might have been that shortly before or after these attacks important vestibular findings could have been elicited. If the vermis were truly involved a vertical nystagmus spontaneous nystagmus should have been present.

DR. GUTTMAN said that the Section was to be congratulated upon the fact that not only the correctly diagnosticated cases are brought before it, but also cases where errors in the diagnosis were made, as the latter are often more instructive than the former. He hoped that in the future more weight will be laid in these cases upon the exact examination of

the cochlear nerve also, as even a negative finding will be a valuable addition to our knowledge in such tumors of the cerebellum.

DR. KOPETZKY said that the case was sufficiently exceptional to warrant much further study in the hopes of adding to our knowledge of the tracts, and he hoped to be able to later report the results of the further examination, particularly a microscopic examination of the tracts of the superior peduncle. For if this was found involved, and the test being negative, it was a finding which was unique.

Nicotine Poisoning of the Inner Ear, Etc., Etc. Dr. Otto Glogau.

To appear in a subsequent issue of THE LARYNGOSCOPE.

The Clinical Significance of Diagnostic Signs of Suspected Mastoiditis: X-Ray Interpretation, Etc. Dr. Harold Hays.

DISCUSSION.

DR. KOPETZKY opened the discussion by citing a case in his own experience, of a patient who walked into his office with the mumps desiring to be operated upon for a right sided mastoiditis, because a radiographer said he had mastoiditis. Otoscopic examination showed a normal drum and ear, and further examination showed nothing abnormal.

The situation is such that the general practitioner is imposed upon. He is not presumed to know the details of plate reading nor the finer points of the pathology involved. He is calling in experts to aid him, and the unfortunate part of the matter is that he does not get the service that he thinks his patient needs.

There are three types of mastoiditis that give similar X-ray pictures. 1. A mastoid infection where the cells have not broken down, but where eburnation has taken place, showing on the plate an increase of density (clouding). 2. An acute mastoiditis with a periosteitis which is located over the mastoid process. This periosteitis gives so much clouding on the plate that very often the outlines of the mastoid cells are not to be seen. 3. Cases which have in the course of a previous illness had an attack of acute mastoiditis and the cell walls have broken down, and who for one or another reason did not come to operation, but underwent resolution and healed. Here there usually is deposited upon the under surface of the periosteum a new layer of dense bone, and there does not take place a reformation of the mastoid cell walls. During the next or subsequent years the patient suffers another attack of acute mastoiditis, and is sent to the radiographer,—and the deposit of bone from the previous attack, and absence of cell wall outlines, are interpreted as clouding, and a misleading report is given to the doctor. For these reasons it was highly essential that those radiographers who do more than simply state that the plate shows density or the presence or absence of cell outlines, should have not only an intimate knowledge of the pathology of the parts affected, but they should also be in possession of a short clinical history of the case so that they may read the findings in the light of the clinical history of the case so that they may read the findings in the light of the clinical history and the pathology that is presented. Only then will the interpretation of X-ray plates by the radiographers be of real value to the surgeon. Otherwise the surgeon or the doctor on the case should take the reading of the density given by the plates, and make his own interpretation likewise guided by the pathology and the history of the case.

Radiographs have proved the localization of extra-dural and perisinus abscesses. Dr. Kopetzky said he had seen that done repeatedly, but the point now to be discussed was: Shall the radiographer say more to the doctor than that this right or left mastoid shows increased density, it also shows with the increased density a sharply outlined demarcation of the mastoid cell walls—or there are no cell walls present—or this is a mastoid process in which all structures are lost—and not venture upon an opinion as to whether or not a condition necessitating an operation exists or does not exist? Where a radiographer is cognizant of the pathology and the classification into which the case he is studying fits, and is able to place his plate-reading in juxtaposition, then he may read and interpret the plate.

DR. LAW expressed regret at the unavoidable absence of Dr. Hays, for being a very good radiographer as well as an otologist, he was especially capable in interpreting X-ray plates.

He agreed with practically everything said by Dr. Kopetzky, but objected to the phrase, "there is a haze or a cloud over the mastoid," which also occurred in a great many reports and which really meant nothing. Dr. Law said he wished to emphasize that for the benefit of the radiologists, not the otologists.

Every otologist had the opportunity in some hospital to visit the X-ray room and become acquainted with the interpretation of the plates. The otologist and the radiologist were interested in the cases in the same way. The X-ray plates show exactly what is found at the operation, but why are the mistakes in interpretation made? Dr. Kopetzky had given the pathological explanation—and they were made frequently. If the otologist would consult with the radiologist and discuss with him the pathology and the history of the case, in a short time much more would be known about the interpretation of the plates of the mastoid.

The main essential was a perfect plate technically, and it was a regrettable fact that these were not always submitted. Dr. Law said he had seen some abominable plates submitted for interpretation, and yet interpretations had been attempted on their basis. When the otologist sends a patient to the radiologist he should always send the history and all the evidence obtainable, or else call him up and give all the information available, and then the two can discuss the plates together and reach a correct diagnosis. Every otologist should be familiar with plate interpretation.

There was another reason for many errors that are made. At the present time almost all the radiographers are using films, where previously plates were used. Take the same mastoid and the same conditions and make a picture on a glass plate and another on a film with intensifying screens and you will have two entirely different pictures, so every one should become familiar with the technique used.

Dr. Law again urged upon the otologists the importance of giving the Roentgenologists the benefit of the history and of the operative findings. "When an operation has been done upon the findings of a plate and the interpretation is found to be wrong, see the Roentgenologist and tell him where it was wrong, and what was found, and then go over the plate with him for your own benefit as well as his, and find out the reason for the error. Over-enthusiasm has sent the pendulum too far one way, and it is on the backward swing now. This work cannot be done satisfactorily unless the otologist, the surgeon and the Roentgenologist all work together."

DR. LEWALD said that Dr. Kopetzky and Dr. Law had so well covered the subject that little could be added, but he had had made a few notes. The first was in regard to mistakes in diagnosis. He recalled two cases of typical pneumonia, with atypical physical signs, which were diagnosed as cases of mastoiditis and one of them with supposed sinus thrombosis, and only after operation on the sinus was it found not to be thrombosed. An X-ray was taken of the lung, and pneumonia was found. Of course the combination of symptoms—high temperature, chill, increased leucocyte count—led to that belief. It was a very simple matter to have a chest plate made in any difficult case of that sort. Some months ago a patient was sent from a tuberculosis sanitarium to New York for a supposed mastoid complication. On X-ray examination a central patch of pneumonia was found, which accounted for the symptoms that led to a supposed mastoid complication.

Another point that bore upon what the Chairman had said, also applied to radiographs of pneumonia after resolution, the persistence of cloudiness of the lung; that would lead one, if he had not seen the case previously and studied it, to think that the pneumonia was still present. The Roentgen signs persisted longer than the physical signs. The plates would show a slower clearing up of the lung than one would expect from the other signs. The same was true of the mastoid. Dr. LeWald said he had seen several instances of this, and it was of great importance to

follow that matter up, and to have such a case X-rayed every two or three days where the surgeon has made up his mind that it might not be an operative one. He had seen a number of plates where, if the history had not been known, one would have thought that an active process was going on in the lung. It was safe to say that the clouding remained even after the clinical signs had subsided, and one would not think of operating.

DR. LAW had spoken of the technique. That was a very important feature; it was sometimes difficult to compare the plates made by one technique with those made by another, but if one was accustomed to a certain technique he would be able to follow a case with great accuracy. Perhaps, just as in pneumonia, one can pick up in the plates signs of great importance, one might be able to pick up signs of mastoid involvement prior to the clinical evidence; whether that might be possible or not he did not know, but it was a thing they had done in a few instances. One of the laboratory workers had come down with an acute infection of the mastoid, and they had been able to detect early signs in a few hours; ordinarily such cases were seen rather late, and not within a few hours after the onset.

DR. KOPETZKY said it was well to recall to mind the work of Schiebe, who proved by serial section what had since been confirmed by others, namely, that in every case where there was an effusion into the tympanic cavity there was also an effusion into the cells of the mastoid as well. This effusion happens simultaneously in all the air spaces of the mastoid process. It does not necessarily signify the presence of a surgical condition. It may be a surgical condition and the radiographer must recognize it for what it is, if he intends to interpret the plate.

Finally, there is one type of mastoiditis whose pathology shows that there never is any breaking down of the mastoid cell walls. This type is the most likely to lead the radiographer into error. This is the so-called hemorrhagic type of acute mastoiditis. Only the clinician who knows the type and reads the plate in connection with his clinical findings will be able to diagnose such.

Dr. Kopetzky said that the Roentgenologists were constantly bothered by the demands of parents for an X-ray examination of children with mastoid conditions and urging the physicians' authority for it. Those who had sectioned and studied autopsy material knew that little dependence could be placed on what was said about cloudy mastoid cells in such cases, for at these early ages there are no well developed cells at all. The fault in this respect lay in the education which the Roentgenologists had given to the practitioners, leading them to believe that they could see things and interpret pathology when there were no anatomical structures to interpret, and where their enthusiasm had carried them too far.

DR. DARLING said that the interpretation of X-ray plates was a very serious business and he had always approached it with a great deal of modesty. Roentgenologist had a great responsibility and should not lead any one to go further than he had full confidence he could go himself. He should not force himself to something that he did not really know. If the surgeon was going to operate he would do it any way, and should do it on his own responsibility. There were two ways of treating a definite mastoid: you either operate or you don't, and that was largely a personal equation of the man who was handling the case; all that the Roentgenologist had to do was to satisfy him on a certain number of anatomical points, for if a man really knows that he knows he has the right to go all the way. Men who have had opportunity to check up and consult, and discuss cases, do what "I think I do every time I run across a case of gastric ulcer. I make a diagnosis from the history, and then from the plates, and I put them together and make a final diagnosis, with a general tendency to throw the weight on the direct evidence of the lesion. I claim that the Roentgenologist has no right to make any diagnosis unless the evidence lies within his specialty, and that he must let the clinician take the burden, unless he is really a consulting otologist as well as a working Roentgenologist, such as Dr. Law and Dr. Dixon."

To get down to the matter of diagnosis of mastoid conditions in children: if the normal side does not show any mastoid cells he ought to be wise enough not to read any signs on the other side. That was simple horse sense. If the normal side showed cells, and in his experience most of the children that he had examined did have cells, he had generally found some difference in the two sides, usually enough to be on the side of the mastoiditis, and they were operated upon, but he was always anxious to get hold of the men who operated and have them confirm the diagnosis, as they had done so far.

He had seen a lot of cases of children with cells, though of course he was aware that children varied in this respect at the same age in showing frontal sinuses and antrum and mastoid cells. One must also be very careful because it was well known that the two sides were not always alike, and that, too, must be borne in mind. There was no reason why all the points laid down by Dr. Kopetzky should not also apply to children, excepting the anatomical structure. One ought to be able to tell when there is a very definite increase in density or if there is a moderate decrease, or if there is not some superficial swelling to mislead one.

DR. LAW did not believe in screens, but others did not use anything else, and apparently got along very well. One must know the pitfalls of screens, if he was going to use double or single screens with films. If you have not a definite contact in all parts of the intensifying screen, the appearance was very like the mastoid where the cells are broken down, etc.

DR. DARLING said he did not care to write any kind of anatomical description of a lesion unless he had at least two plates of each mastoid, and could use one to check up the other by.

He hoped that Dr. Law would go a little more into detail in regard to his technique and state just why he advocated plates always and what was his exact objection to screens.

DR. LEDERMAN asked Dr. Law whether or not he could distinguish between exudates and disintegration of the mastoid. He then cited a case in which he asked one of the prominent experts of the city to see a friend as well as patient, whose symptoms ran rather a classic course and indicated surgical disease of the mastoid. This was verified by X-ray examinations. These examinations were repeated four or five times and each time the report came back that the pathological condition was increasing, and yet the patient refused operation. Unfortunately for our opinions, the patient got well without operation. Of course it is always possible that in these cases the condition was due to some exudate which was absorbed, and it would be interesting to hear from Dr. Law in reference to this subject.

DR. GUTTMAN said that a negative finding of an X-ray picture is of value, that is, if the picture shows a healthy condition we can rely upon that, irrespective of the clinical symptoms; a positive finding, however, cannot be relied upon. In accessory sinus affections, the dissimilarity of the right and left sides is of more significance than that of the mastoid bones, where anatomical structural differences of the two sides are more frequently encountered. One point which was very well brought out by the Chairman, was that in most cases of acute otitis media purulenta there exists also an involvement of the mastoid bone; therefore the surgeon who ignores this fact and operates on such X-ray findings is more to be blamed than the X-ray man. In most of these cases, if proper drainage is established through the drum membrane, the mastoid bone will also get well.

He then cited a case which showed symptoms of mastoiditis clinically and cloudiness in the X-ray picture, yet got well without a mastoidectomy. The blame therefore cannot always be placed on the X-ray man, but may rest on the otologist as well.

DR. HERZIG said that as one of the speakers had already mentioned, a complete clinical history should be given to the Roentgenologist, and then after operation a written report should be sent to him, and in that way both the Roentgenologist and the otologist could check up the case and in future secure better interpretations.

DR. KOPETZKY said the discussion was digressing from the point, and that all could give similar stories. He could duplicate the story of the man who refused operation or of the one diagnosed by the X-ray who would have been operated upon. The point under discussion was the better mutual understanding, the better inter-relationship of the otologist and the Roentgenologist, so that the Roentgenologist shall interpret the findings in line with the pathology and in line with the clinical history, but particularly in line with an understanding of the *lesion* that he was picturing—the lesion that he saw. He sees it in a certain media and from that he must interpret it into fundamentals of pathology; that was the common language; pathology is the common language of the chemist making a report from a chemical analysis or of the Roentgenologist from the use of the X-ray, etc. Everything should be interpreted in the language of pathology, for all understood it, and the plea was that the Roentgenologists should accept pathology as it was understood in otology and make their readings in accordance with it. Of course he was not referring to the untrained or over-confident of either specialty, but about equals in each who understood one language and knew what they were talking about.

SECTION ON RHINOLOGY AND LARYNGOLOGY.

May 24, 1922.

An X-Ray Study of Intubation. Dr. E. Giddings, Physician in Charge, Willard Parker Hospital, New York, and Dr. D. E. Ehrlich, Resident Roentgenologist, Willard Parker Hospital, New York.

To appear in a subsequent issue of THE LARYNGOSCOPE.

DR. WILLIM LAING SOMERSET said he was a little in the frame of mind of the gentleman in Congress, who asked: "Mr. Speaker, where am I at?" He had tried to get some information as to what he was to discuss, but failed, so had concluded that it did not make much difference what he did say, and that as a matter of fact he had probably been asked to participate in the meeting more in the line of an exhibit of a patriarch of intubation from the last century. The men did intubate in the last century, even though they did not have the X-rays to show where the tube was after it was inserted; neither did they have a colony of chronic tube cases to take up into the country. The speaker of the evening had stated the reason we do not have them now—because they all died. Some of them used to die, and some die now. So far as his experience went, the curse of intubation in the hospitals was broncho-pneumonia. He had had a great deal of experience in hospitals and in the home, in some very poor homes, and the difference in mortality was surprising. Chronic tube cases began to accumulate about the beginning of this century, just about the same time there began to be wholesale instruction in intubation in the hospitals. Whether there was any connection between the two things, he did not know.

He wished to give a very brief reverse and obverse view in connection with the matter of intubation. When a man does a great thing, realizes that it is great, appreciates the value of his work, and is buoyed up by a feeling of sweet complacency, even assumes the attitude of Little Jackie Horner and not only thinks but says "What a great boy am I!" he is not condemned by his fellows—in fact, so far as buttered parsnips are concerned, he is likely to fare better than his more modest colleagues; but he misses the main thing; he grasps at the shadow and loses the substance. He cannot have his cake and eat it, too. It is Atropos: The gifts of the gods are never offered a second time. Such a man shall not sit among the immortals. But when a man does a great deed and, through true humility of soul and intense singleness of purpose to make his work as nearly perfect as is humanly possible, holds on the even tenor of his way without realizing that he has done anything out of the ordinary, incapable of feeling even patient superiority—such a man serves

twice, by the beneficence of his work and by his attitude toward his work. He raises a standard for all mankind for all time. His place is secure, he acquires merit and his merit grows with every turn of the wheel; he is a lasting and complete refutation to any cynic who says that the practice of medicine is not a profession rather a conspiracy. The practice of medicine is peculiarly and exceptionally fortunate in numbering in its ranks those who have given their all in serving it. Of all the thousands that have died in its service not one carried the torch with a more tireless, a more persistent and a more unselfish zeal than did the author and finisher of intubation, Dr. Joseph J. Dwyer.

Management of Certain Nose and Throat Disorders in Singers and Speakers. Dr. Irving Wilson Voorhees.

To appear in a subsequent issue of THE LARYNGOSCOPE.

DISCUSSION.

DR. L. D. ALEXANDER, JR., said that Dr. Voorhees had presented a most interesting account of the general conditions and had covered the ground so thoroughly that it was difficult to find any point to discuss. He wished, however, to emphasize what had been said about the co-operation between laryngologists and voice teachers. For many years he had urged that there should be a state registration of vocal teachers, who should show some qualifications as teachers of the vocal art and also some knowledge of anatomy. If such a regulation were instituted there would be a much better class of teachers, and a class who would better appreciate the co-operation of the laryngologist. He had co-operated with some teachers along the line suggested by Dr. Voorhees, some of whom had spoken before the Section of their laryngeal measures which had been a benefit to him and to others. Other teachers had accepted his general opinions as to what should be done in various instances, and when the pupils were young and their parents were consulted in many instances severe major defects had been remedied.

The cause of the vaudeville artist referred to by Dr. Voorhees was very interesting. Some years ago a patient had consulted him as to the advisability of having his larynx skinned. He advised against any such procedure, of course, but his advice was not heeded; needless to say the man was skinned to the tune of $500.00 with no obvious result, so when Dr. Voorhees stated that he exsected the arytenoids, etc., it would be interesting to have further information. The case of laryngeal hemorrhage, which he seemed to consider rather rare, had not been so in his experience, and he had seen a great many cases; in all instances it was due to vocal strain or excitement, and he had never thought it an indication of hemophilia.

DR. HAMPTON P. HOWELL said that Dr. Voorhees had covered the subject most thoroughly from the physical standpoint and about what the doctor can see in the nose and throat of the person who undertakes to become a singer. That was all very well, but there is a psychical element in a singing pupil or a singer which must be considered, and the mere suggestion of an operation which they did not feel was in any way necessary might in some instances produce so great a psychic effect that it might spoil the career of a singer. It is very seldom that any one looks in a nose and sees that it is perfectly straight. The septum may be bent a little one way or the other or there may be a slight incurving of the bones and cartilage as well, and singers very often have large turbinals. In some of the very best singers he had noted that the nose was almost closed by the lower turbinals, and yet they had such international reputations that one would hesitate to do anything to lessen their size. It is the same with the tonsils. It is often very difficult to determine when a tonsil is diseased. Dr. Howell said he did not think the removal of the tonsil, where the pillars were left intact, was any damage to the singer, but if one tonsil was a little larger than the other and nothing could be squeezed out, and there was no history of sore throat, it was a grave question whether one should operate with the hope of helping this class of like case.

Certain things, however, the specialist ought to know and recognize in his department, so far as singers go. He ought to know how to try out a voice and know whether it is a baritone, or tenor, or contralto or soprano, etc. Most specialists in examining a singer feel that they have to be very careful, for the patient is a temperamental person and nothing must be said to dampen her ardor, and the teacher also has to be considered, so the situation is rather difficult; yet he ought to be able to try out the voice, have the person stand up, note her general carriage, resonance, etc., etc.; all these things come into his domain. Dr. Voorhees had spoken of three things which have to be considered—the motor force, the vocal element, and the resonator element. Another factor is quite as important, and one that can be improved—the articulatory part—the mouth cavity, use of the tongue, the speech, etc. If a person comes in with a slovenly method of speech he or she will probably have a slovenly method of singing; one is a greater condition of the lesser, they are not opposed to one another. The physician should attend studio concerts and take a few lessons from a teacher who can show him what the essential requirements are for voice production, for he certainly must have the phonetic side developed if he is going to make any success of this phase of his office work. We know very well that the average music pupil is a wanderer. They have had one disappointment after another, and years are often spent in trying to get back what has been lost by artificial methods of teaching. The laryngologist ought to be able to know the speaker's problems of posture, attack and resonance, etc., as well as the use of the laryngoscope, and he should make a close study of the intralaryngeal muscles, etc. It is very important that the neuro-muscular mechanism works well, but one cannot tell from looking at a singer's vocal cords whether he is a tenor or a bass; it is the same with the women's voices, and not all cords are glistening white. Dr. Howell said he had seen many singers who had a certain degree of dull red color about the cords. Probably no one can sing for three hours at an operatic entertainment without showing a certain inflamed condition; but, like the eye, the larynx can stand a great deal of vibration or work that is done by its muscles, and yet seldom tires from that, but the tones must be well placed; that is the great point. The Maoris of New Zealand are among the finest and most athletic people in the world today, yet it is said their voices are without resonance and in proof of this fact the X-ray has shown that they have very poorly developed sinuses. Of course the oral cavity and the nose are very important, too. A laryngologist may not know what nasal resonance in speech and song, etc., mean, that one must sing with the air coming *through* the nose, etc. One may not be able to tell whether the soft palate has moved forward or up or down, but by correct use, viz., by raising the upper lip in speech or in singing and getting it a little way from the lip, we avoid a "white" oral resonance, giving the dilated alae a chance to act, so open the nose passages and at the same time letting the palatal curtain fall, and you get that full type of voice that we call rich and succulent; for without taking full advantage of nasal resonance, while with a very forward voice in the front of the mouth you get a very light tone. If you have heard Galli-Curci sing, after some time you find that it is almost too perfect, too focalized, too forward, and you fail to get those other qualities in the voice which add so much. Dr. Howell said that in his talk he had been a little more physiological than Dr. Voorhees had been, but this is just the right attitude for the nose and throat men to take, and just as the teacher of singing should have some knowledge of laryngology but should not talk about it, so the laryngologist should know something about singing.

At this point in his discussion, Dr. Howell touched upon the more or less acceptable theories in the so-called registers of the voice, the action of the intrinsic muscle of the larynx, with especial emphasis on the uses of the crico-thyrois and internal thyro-arytenoideus muscles in vocalization,—mentioning variations in their use with corresponding differences in the use of registers of the voice. He then ended his talk with the plea that the laryngologist enter more sympathetically into the subject of voice production and so be of more aid to both teacher and singer.

DR. FLOYD S. MUCKEY said that when he was a student of medicine at McGill University, he spent a summer in Vermont with some relatives. In the neighborhood was a young man who was not, as they say, "all there," who used to do some very simple and foolish things. One day this young man went out into the woods to chop wood. When he got there he found he had forgotten his ax. He remarked: "Well, you can't think of everything." Those who write and talk about the voice are a good deal like that young man; they do not think of everything. The ax is a fundamental factor in wood chopping—we cannot chop wood without it. There are also fundamental factors in voice production. Most persons who write and talk about the voice seem to forget these fundamental factors. We cannot speak or write intelligibly about voice production and ignore these fundamental factors.

Dr. Muckey said he agreed that any pathological condition should be removed. Few men realized what was the principal cause of these pathological conditions. In his opinion it was the incorrect use of the mechanism. There are two fundamental factors in voice production: one is the vibrator which starts the air waves, and the other was the amplification of these air waves by means of resonance. The tones are all started by the vibration of the vocal cords. The amplification is brought about by what is termed resonance. In order to get the proper air waves started there must be a free swing of the cords. Here is where all the singers and speakers get into difficulty: They don't get the free swing of the vocal cords. The thing which prevents the free swing of the cords is the pulling in of the ventricular bands. This causes an irritation of the larynx all the time. If it is kept up and the singer or speaker uses the voice a great deal, there is bound to be a chronic congestion of the whole larynx and the proper action is impossible. Unless they do get the free swing of the vocal cords the whole matter of voice production had better stop. It is absolutely impossible to sing or speak for any length of time with false cord or ventricular band interference without getting into serious difficulty. It is very easy to detect this:

A tone produced with "false cord" interference is harsh, of poor quality and small volume. A tone produced with this kind of interference has much the same characteristics as the tone of the piano string when the finger is placed upon it. It lacks life and fullness. The next thing is to amplify the air waves started by the free swing of the cord. The only factor which can do this is what we call resonance. A tuning fork and resonator will illustrate what is meant by resonance. "When I strike the fork, I can hear it so far. You cannot hear it at all. I strike it again and place it next to this little metal ball and you hear it, thus. I can hear the fork without the resonator about three feet from my ear; I can hear it in the open (I have measured it) 900 feet. This is a factor which is given to the singer and speaker for nothing, and which has that remarkable effect of amplifying the air waves so that the tone can be heard three hundred times as far as without the use of the resonator. Resonance is just as important in quality as it is to volume. Without resonance, you could not hear my voice; without resonance you could not produce the different voice sounds. We could not pronounce the consonants; we could not differentiate the vowel sounds. Should not the teachers understand fully this matter of resonance? It is the most important factor aside from the free swing of the cords. Resonance is not as effective when the swing of the cord is interfered with as when we have a free swing of the cords. (Illustration.) These are the two things that we ought to know if we are going to advise the singer and speaker. It is what the voice teachers ought to know. To show how little is known by voice teachers in regard to these two factors: Recently an article was written by two voice teachers who were arguing against the use of science in teaching the voice. They said that if you used the mirror the whole voice mechanism is disarranged. In fact, that "the voice is produced and resonated in the sphenoidal fissure!" How much do they know about voice production? You all know where the sphenoidal fissure is; it has no connection with voice mechanism. It is filled with nerves and blood vessels. There is no vibrator there, nothing to start

air waves with, no possibility of resonance. That is just as much as any of them know about voice production. What chance has the singer or speaker to get these two fundamental things which are absolutely essential to the use of all the capabilities of the voice mechanism and to the prevention of throat disorders? What chance has the pupil to get through the training of the teacher and to make a really successful public career? These are the things that the throat specialist and the voice teacher should be familiar with."

Dr. Voorhees had spoken of the use of the uvula and of the soft palate in the production of high tones. The place where all pitch changes are produced is the larynx. The larynx is the pitch mechanism, and the uvula and soft palate have absolutely nothing to do with the pitch mechanism or with the pitch of the tone produced.

In regard to the motor element: Something was said about the use of the diaphragm, the muscles of the back, etc. The motor power in voice production is not the diaphragm. The diaphragm and the intercostal muscles are the main muscles used in ordinary inspiration. The antero-posterior diameter and the lateral diameter of the chest are increased by the contraction of the diaphragm and the intercostal muscles. This enlargement of the chest stretches the structures of the chest walls and the lung substance. The air rushes in to fill the partial vacuum thus formed and inspiration is complete. In ordinary expiration the intercostal muscles and diaphragm are suddenly relaxed and the energy stored up in the chest walls and lung substance forces the air out. The stored energy is therefore the motive power in expiration. In speaking and singing we relax the respiratory muscles gradually in order to get the desired amount of air pressure against the vocal cords. The breath is analogous to the belt which runs from the engine to the mechanism to be operated. It is merely the connecting link between the motor and the mechanism.

One of the speakers stated that the chest, the pharynx, the mouth, the nose, and the accessory sinuses were resonance cavities. The only cavities which can act in reinforcing the air waves started by the vocal cords are the cavities of the pharynx, mouth and nose. The chest is not a resonance cavity. There are many valid reasons why the chest cavity and the accessory sinuses cannot act as resonance cavities. A resonance cavity must have a particular shape. Resonance is the reflection of the phases of condensation of many air waves in such a manner that they are brought together or concentrated near, and within, the restricted outlet of a cavity. These air waves leave the vibrator one at a time and are reflected from different points within the cavity, until many of them have been brought together near the restricted outlet and then discharged as one large wave. This requires a particular shape of the resonance cavities, namely, a large space in the pharynx which gradually narrows down, by curved surfaces, until a restricted outlet is formed at the mouth and nostrils. The conditions essential to the production of such a shape in the voice mechanism is the low and forward position of the soft palate and the high and forward position of the back of the tongue. This will give the concentration of the air waves just back of the opening of the nostrils and the mouth. This position of the soft palate and the tongue is absolutely essential to the proper use of resonance.

Another thing: if you pull down the back of the tongue, you are putting the larynx on tension and interfere with the action of the pitch mechanism. Again, if you pull up the soft palate, you shut off the upper pharynx and the nasal cavities, the largest resonance space we have, and shut off more than half of the resonance space. The space which is left is unsuitable for the reinforcing of the air waves.

ANOTHER CHART.

Dr. Muckey said he had worked for twenty years with Professor Hallock of Columbia University upon the mechanism of the voice. The first thing they had to do was to construct an apparatus which would tell the difference between a tone of good and bad quality, of good volume and bad volume. That apparatus separated the voice into its partial tones and told the relative intensity of the tones. (Photographic record of vowels,—ah—) . . . . . .

Two charts were shown which were photographic analyses of the vowel ä. One showing 8 partial tones with fundamental tone very strong and the overtones diminishing in intensity as they rose in the series. This tone had good quality and good volume, showing the correct use of resonance. The second with only four partial tones, having the fundamental tone very weak and the overtones increasing in intensity as they rose in the series, represented small volume and poor quality. The immense loss in volume and quality shown by the second photograph was caused, chiefly, by the raising of the soft palate and the consequent interference with resonance.

There are three things which interfere with the correct action of the voice mechanism: 1. The interference with the swing of the cords,—the contraction of the ventricular bands is the only thing which can interfere with the free swing of the cords. 2. Pulling down the back of the tongue destroys resonance and interferes with pitch mechanism. 3. Pulling up the soft palate takes away at least half of the resonance capabilities.

One statement as to the manner of getting rid of the interference. One of the speakers said that the vocal cords would respond to the action of the will.

Dr. Muckey said that he had very often made the statement in public that the control of the vocal cords was involuntary, and once was criticized by Mr. Hawn, who said if that was so, one would be squirting out tones all the time. There is a difference between the action of the vocal muscles and the muscles which move the finger. We cannot pull up one vocal cord and leave the other out unless there is some pathological condition present. The action of the vocal muscles is really the result of the desire to have tone produced. The position of the ventricular bands for a free swing of the cords is that of relaxation. When you are breathing in through the nose quietly the ventricular bands are widely separated and in that position we can get a free swing of the cords, not otherwise. "When I am speaking to you, the back of my tongue is resting against my upper teeth and I am getting the use of all my resonance space. Most of the tone is coming through the nose all the time, and it should. When one is breathing quietly through the nose, the soft palate is down and forward, and that is its proper position if you are going to get full use of resonance. If you interfere with resonance, you interfere with the swing of the cords. The muscles of the false cords, the back of the tongue and of the soft palate are swallowing muscles and every time you swallow they all work together.

Dr. Muckey said he came here on January 1, 1893, to spend a year to learn all about voice production; that he had been here ever since and had been working hard all the time and had not learned it all yet; that it had been only within the last year or two that he had been able to sum up the whole matter in one sentence: That if you relax the ventricular bands, the hyoglossus muscles, and the muscles of the soft palate you will never have any trouble in voice production. If you study the sensations in the throat when you are breathing quietly through the nose and allow the cords to come together and the back of the tongue to remain quiet and the soft palate down, as it should be in voice production, you will never have any trouble. The vast majority of the disorders and discomfort of singers and speakers will disappear without any particular medical treatment.

A few words in regard to the terminology, that is in use by those who write and speak about the voice: almost every term is misapplied. Dr. Muckey said he had often wondered about this, and perhaps Dr. Voorhees had supplied a clue: We hear so much about dry and wet tones. Dr. Voorhees spoke about dry and wet throats. The voice teachers and critics don't know much about the voice, and it is possible they got the notion of the dry tone from the dry throat, and of the wet tone from the wet throat. He had practiced throat and nose work for twenty years and had seen a great many very badly treated throats, and at one time was told that there was a vocal nodule on his left vocal cord. He went back immediately to his office and studied his cords very carefully. He

could see his cords as well as he could see his hand, and tried very hard to see the vocal nodules, but could not. In fact, the very action which is supposed to produce vocal nodules is an impossibility; one cannot make the cords rub together toward the center; if you are going to stretch them, you will have a straight edge, and there is no way to make them touch in the center. Singers' nodules exist largely in the imagination of the examiner.

About being able to tell from the examination of the voice mechanism whether a person is a bass, tenor, contralto or soprano. That is absolutely impossible. All have seen statements about Caruso. One was to the effect that his vocal cords were twice as long as the ordinary vocal cords. If that were so he could have sung lower than any bass we have ever had. Such a condition of the vocal cords would give a very low pitched tone. Dr. Muckey said he would not say that it could not be produced, for he believed it possible, but with a cord two inches long the voice would certainly be classed as bass and not as tenor.

At one time when he was in Minneapolis the Fisk Jubilee Singers came there and he went to hear them. They sang a chorus first, and he was struck at once by an immense bass voice—the most wonderful thing he ever heard in his life. They sang in church and there were sixteen singers in all. This bass covered not only the other singers, but the pipe organ as well. He had never heard anything like it. It did not seem to come from any one place, but rolled in from all sides and filled the church. On the program was a bass solo, but when the man stood up to sing one heard nothing at all remarkable, but every time he sang in chorus it was the most wonderful thing. They sang three times, and he heard them every time, and after the last concert he went up to this man and spoke to him, and asked permission to examine his throat mechanism, but found only the ordinary mechanism.

Dr. Muckey said he had seen hundreds of persons who, if size and shape had anything to do with it, could have produced more wonderful tones than this man. Here in the same evening this man had two very different results. That shows that it is the use we make of the mechanism, not the mechanism itself, which produces the results. In his opinion any mechanism which is normal, or not greatly injured by bad use, can fill any auditorium ever built without any effort at all. We cannot do anything to help out voice production; it is practically an involuntary thing. The articulation is in the beginning voluntary, but the mechanism should be left to itself. With the free action of the pitch mechanism we ought, at least as a minimum, to get three octaves: the nature of the mechanism itself tells you that there should be three octaves as a minimum.

The matter of registers had been touched upon. Dr. Muckey said he had heard a great many persons talk about registers and had tried to get some definition of this term, but could never learn anything from those who talk about it. The fact is that the whole range of pitch is controlled by two muscles, the vocal muscles and the cricothyroid muscles on the outside of the larynx. They act very slightly for the lowest pitch, and contract a little more and more until the very highest pitch is reached; therefore there is no change in the mechanism and no change in registers. Registers mean wrong use of the pitch mechanism. The tongue has a double function. The back of the tongue is used in swallowing and the front part is used in articulation. If the muscles of the back of the tongue are contracted during tone production the front part is not free for articulation.

The only thing the singer and speaker can do with the voice mechanism is to interfere with it. They should therefore be taught to let the voice mechanism alone. Instead they are taught to do things with it and thus to interfere. Correct voice production under these circumstances is hopeless and throat disorders are certain.

Co-operation between the specialist and teacher has been suggested. A knowledge of these fundamental factors, namely, the free swing of the cords and the proper use of resonance, is the only basis of helpful co-operation. Without this knowledge the specialist and the teacher are

in the position of the young man who went out into the woods to chop wood without his axe. Their efforts are futile and God help the poor speaker and singer.

DR. VOORHEES, closing the discussion, said that state registration of vocal teachers had been brought up two or three times in teachers' societies and there had been some very interesting discussions on the subject, but it had not yet been required, though perhaps some day we may have it. Many teachers know nothing at all about anatomy, but some have been trained abroad, where they did some dissecting and studied the anatomy of the head and neck. One man in Philadelphia stated that he had worked a whole year on the subject.

The question of the co-operation of voice teachers and laryngologists was something which seemed difficult of attainment, but might be attained before the millenium.

Dr. Alexander had inquired about the case of inter-arytenoid thickening. The posterior wall between the arytenoids was thick and was bitten away with forceps to allow the arytenoids to come closer together, etc.

Dr. Howell spoke of the removal of the tonsils in singers. A questionnaire had been sent out to 500 singers and teachers and to 500 doctors, and the consensus of opinion seemed to be that in most instances the voice was probably improved, raised from a half to a full tone; in some cases it had been said that the voice had been spoiled by a bad operation, but there may not have bten very much voice to begin with.

Articulation (diction), of course, was very important. Some teachers taught dramatic expression and interpretation, the old-fashioned elocution. The American voice is notoriously bad according to the standards foreigners set for us, but can be greatly improved by proper phonetic practice.

Nasal Suction Irrigation Nozzle. Dr. Holland N. Stevenson.

The development of the suction irrigation method for the treatment of nasal conditions by Dr. Lore has added a therapeutic means, of considerable value in combatting nasal disease. It has been used with benefit in acute and chronic sinus involvement, as well as in chronic rhinitis and ozena. One of the chief difficulties in using this method, however, has been the glass nozzle. These glass nozzles are easily broken and do not fit the nostril properly in all cases.

In order to overcome these objections, the nozzle presented here was devised. This nozzle is made of metal and is on the general plan of the Lucae ear douche. It is composed of two parts, the base and the tip, which are screwed together. There are three tips of different size.

The base is a metal disc one inch in diameter. Through the center passes a tube with a bore of 3/32 of an inch. This tube extends into the tip and far enough back for the attachment of rubber tubing. Towards the outside of the disc is another tube with a bore of 3/16 of an inch, which also extends backwards for the attachment of rubber tubing. The edge of the disc is threaded so that the tip can be screwed into it. The tube passing through the center is the inflow tube and that towards the edge the outflow tube. The inflow tube is extended beyond the tip by adding a small piece of rubber tubing.

The tips are in the shape of a truncated cone, the base of which is ¾ of an inch in diameter and the small end 5/32, 7/32 or 9/32 of an inch in diameter in the different tips. The distance between the base and the smaller end is ¾ of an inch. There is, therefore, a variation in the taper of the three tips. The base of the cone joins a cylinder about ½ of an inch high, the end of which is threaded to fit the base, and just beyond the thread is a knurled ring to give a grip for screwing the tip into the base.

This nozzle is used in place of the glass douche in the suction irrigation of the nose. The inflow tube is connected by rubber tubing to the solution to be used. Suction is applied to the outflow tube and the nozzle inserted into one nostril. The other nostril is closed and when the patient closes the naso-pharynx, as in swallowing, the solution is thrown into the nose and drawn out by way of the overflow tube.

PHILADELPHIA LARYNGOLOGICAL ASSOCIATION.

A stated meeting of the Philadelphia Laryngolical Association was held on Tuesday, January 3, at 8:15 P. M., Cadwalader Hall, College of Physicians.

A Case of Unilateral Deafness Following Cerebro Spinal Meningitis. Dr. Henry S. Weider.

The patient, W. T., age 9, was a perfectly normal child until July 30, 1921, when he was taken ill with epidemic cerebro spinal meningitis and removed to the Children's Homeopathic Hospital. From the history obtained the acute stage lasted about eight days, during which time he was comatose. When he regained consciousness he was almost totally deaf, the right ear being not as bad as the left, but also deaf. Both arms and legs were paralyzed, but later recovered, the right being the last to become affected and the first to recover motion. Fairly good motion was regained in seven days. His gait remained unsteady until two weeks previous to when he was first seen by the writer on November 7, 1921, when he presented himself at the Polyclinic Hospital in the service of Dr. Walter Roberts because of deafness of the left ear.

On examination the ears were normal in appearance. Hearing tests showed that in the right ear the air conduction was about equal to the bone conduction, which was shortened but only moderately. The left ear showed no positive air conduction, although the child claimed he heard the Galton whistle after four complete turns of the scale with a noise apparatus in the right ear. He also claimed to get a very short bone conduction with a heavy 256 fork, but this was probably crossed conduction to the good ear. His Schwaback was shortened and his Weber was lateralized to the right side.

The patient's station is good. There is no Romberg sign, no dysmetria and no adiadokokinesis. There is no spontaneous nystagmus to right or left, but there is a very short transitory vertical nystagmus on looking upward.

On turning him ten times in twenty seconds to the right he showed 12 seconds vertigo, but no vertigo could be elicited on turning a similar number of times to the left. He showed no nystagmus when turned ten times in twenty seconds in either direction. On douching the right ear with water at fifty-six degrees after 2.10 he showed a very brief small rotary nystagmus to the right, with none on tilting the head backward. The left ear showed no response after two minutes and thirty seconds douching.

This case is interesting from the standpoint of the great amount of recovered function of the whole body in general and particularly of the right cochlea, which has regained a greater portion of its hearing powers, although the vestibular apparatus shows but very feeble evidences of activity.

A Case of Focal Infection from Acute Mastoiditis Simulating Thrombosis of the Lateral Sinus. Dr. Henry S. Weider.

This patient had developed otitis media two weeks previous to being seen by the writer on the twenty-sixth of March, 1921, and had been treated at one of the large hospitals in the city when paracentesis was performed. He had had no pain in the intervening time and the discharge had almost ceased by the twenty-fourth of the month. The following day he began to feel badly with a rise in temperature and the development of nausea and vomiting. His temperature rose until it reached 104° with persistence of the vomiting until seen by the writer the following day.

Two hours before he was seen by the writer he developed a violent chill. When first examined he had a temperature of 103.8° and a pulse

of 110. The right ear showed a moderate amount of discharge, but there was no pain anywhere, merely a heaviness of the head. There was absolutely no tenderness over the mastoid region, jugular vein or emissary vein. There was no marked bulging of the tympanic membrane nor drooping of the posterior canal wall.

A free incision was made in the tympanic membrane, ten per cent phenol glycerin instilled into the ear, the mastoid region painted with iodin and the patient ordered into the Polyclinic Hospital for observation and study. He was then given the usual calomel purge, with the application of hot water bag to the affected ear and the instillation of 5 per cent phenol glycerin every three hours. He was placed upon liquid diet.

On admission his temperature dropped rapidly to normal, where it remained until 1:30 p. m. the following day, when he had another chill, which was followed by a temperature of 102.3°, subsequently dropping again to normal. The next morning at 1:30 he developed another chill, the temperature rising by 4 a. m. to 101°. There was no pain nor mastoid tenderness. The discharge from the ear was very profuse, yellow in color and creamy in consistence. Blood examination showed a leucocytosis of 22,100 small lymphocytes 18 per cent, large lymphocytes 3 per cent, transitionals 2 per cent and polymorphonuclear leucocytes 77 per cent. Malarial and Wassermann examination negative. The blood culture was also negative. X-ray showed probable disease of the right mastoid. Urine showed S. G. 1002 faint trace of albumen, negative for sugar and casts, triple phosphates and bacteria present.

The following day his temperature ran between 98 and 99°, leucocytes dropped to 19,700, polymorphonuclears 81 per cent. As he continued to have no pain and his temperature remained low without further chills it was determined to await further developments before operating.

Twenty-four hours later his temperature again showed a tendency to rise to 100.4°, reaching 101.8° the following day, when he developed great pain and swelling of the left wrist. The condition of the ear remained good, the discharge being free with no drooping of the canal nor pain over the mastoid. The temperature appeared to be entirely from the joint condition, remaining between 99 and 101° for the next four days. On the third of April the temperature rose to 103.4° without chill, but accompanied by considerable swelling and pain in the right shoulder joint. Although the second blood culture proved negative and the local conditions about the ear remained good, it was considered that the joint conditions were secondary to the focus in the mastoid region and, despite a fall in the leucocytes and a drop in the polymorobonuclears to 61 per cent, mastoidectomy was determined upon.

On April 5 the writer performed a simple mastoidectomy, finding some softened bone and pus. The sigmoid sinus was exposed but not opened, as it appeared to be normal. Following operation the wound healed well, but the pain in the wrist and arm persisted for some time, although there was no further involvement of other joints. The patient developed temporary attacks of dyspnoes at times, but these were considered by the internists as neurotic in type. In about one month he made a complete recovery, full motion being restored to both joints.

The case is instructive mainly from the close simulation of thrombosis of the lateral sinus with the septic temperature and chills of short duration, followed by metastatic joint involvement and all apparently due to a focal infection in the mastoid process.

A Case of Unusual Hypertrophy of the Lingual Tonsils Without Symptoms. Dr. Henry S. Wieder.

This patient is a nurse. She has had her tonsils removed when about ten years of age. She has an unilateral deformity of the face which she got when falling from a horse. There is an unusual hypertrophy of the lingual tonsils but without symptoms. They project up like tumors on each side when she opens her mouth. I do not care to operate, as they do not trouble her.

DISCUSSION.

DR. WM. WATSON: This patient has had no symptoms from these extremely large lingual tonsils. I would like to know why Dr. Wieder could not operate on her. I believe that these tonsils have almost the same effect on the general system as the faucial tonsils.

DR. ROBERT F. RIDPATH: Dr. Wieder's last case—unusual hypertrophy of the lingual tonsils—is an interesting one. A case similar to this occurred at the Medico-Chi Hospital. After following the case for some time we decided it was an hypertrophy, or rather, another lobe of the thyroid gland sticking up underneath the mucous membrane, simulated this case very much. There are occasions in which one of the lobes of the thyroid gland will hypertrophy or protrude in just this manner.

DR. HENRY S. WIEDER (in closing): With reference to your discussion, I would say that this is a bilobe affair and cases of lobe of the thyroid are almost invariably located in the middle of the tongue and are unilateral instead of bilateral. They must have been in since the tonsils were removed at the age of three. They fit into the pockets where the tonsils have been removed so well that I think that is the reason why there are no symptoms. Why I do not operate—I have never seen any trouble from the lingual tonsils except the production of the hacking cough. We do not have absorption from the lingual tonsils—not as much as the faucial, if we keep them clean and empty. We have absorption of the tonsils because we retain the secretion. It is the same with adenoids. We have closure of the different crypts of the adenoid. We do not have it in the lingual. This patient has no symptoms whatever, so I see no occasion whatever to operate.

Case Showing Ossicles in Situ After Complete Destruction of Membrane Tympani. Dr. Wm. F. Moore.

I had hoped to have this case here this evening, but she could not come. The interesting part of this case to me was that this condition developed after she had scarlet fever. The hearing became slightly impaired and grew worse after repeated attacks of grip. Membrane tympani was entirely gone, but you could see the ossicles in position. Her bone conduction is fairly good. Things I want to discuss about this case are that, in the first place, I do not see how it is possible, with the amount of discharge this woman had for nine years, to have the ossicles as well defined and in good shape as this woman's are today. In this case I tried various things. This woman's drum has responded remarkably to applications of silver nitrate. The question is whether in a case of this sort it is worth while to get any sort of membrane to grow. People coming to you in this condition will expect some relief. Even if you do get complete regeneration of the membrane, it is a question whether you can expect any improvement of hearing with the amount of destruction you have around the oval window.

Case Report. Dr. Arthur W. Wagers.

The case I have to present this evening is that of a man, an ex-soldier, who came to my attention, through the U. S. Veterans' Bureau, for examination.

L. M., a vocational training student, aged 28, gives a present history of partial deafness, nasal obstruction to breathing, headache over both parietal regions, and constant tinnitus in both ears. He also complains of being easily fatigued.

The past history as related himself is, briefly, as follows: While in camp receiving his military training, he complained of difficult nasal respiration while doing violent exercises. During December, 1917, he was sent to the hospital, where a submucous resection of the septum was done. He was discharged, only to return two weeks later with measles. Previous to this time there had been no trouble with the ears. Soon after the onset of measles pain was felt in the left ear. This was allowed to continue until spontaneous rupture of the drum membrane afforded relief.

In passing, I would say that I believe an error was made in not freely incising the membrane instead of permitting spontaneous rupture to take

place. It is at least possible that had this been done, the succeeding series of unfortunate events might have been avoided.

On January 8, 1918, before leaving the hospital, a mastoid operation was done on the left side. Following this operation, the temperature continued high, 104° to 105°, and never below 100° for a period of two months. On the day following this operation marked facial paralysis appeared on the left side, and loss of hearing in the left ear was, for all practical purposes, complete.

On February 8, 1918, a second operation was performed on the same mastoid. Healing was greatly retarded on account of generally weakened condition. Patient was discharged from the service on June 3, 1918, at which time the mastoid had healed, but discharge still continued from the middle ear. A third operation on the left mastoid was done two months later at the hospital in Sayre, Pa. Following this operation the discharge ceased and there has been but slight discharge at infrequent intervals since that time.

The facial disfigurement, due to paralysis, showed some improvement during the year following the first operation, but there has been no noticeable change during the past year.

At no time had there been any trouble in the right ear until soon after entering State College as a student in the autumn of 1919. Without any apparent reason, the right ear became painful, and although he received early medical attention, the same error was made as in the case of the left ear in allowing the drum membrane to rupture instead of incising the membrane as would be rationally indicated in such a situation. Pain and discharge continued for more than a year until finally, in the spring of 1921, the middle ear became dry and has remained so to the present time. All of the right ear drum is destroyed except a portion of Shrapnell's membrane which serves as a support for the ossicles, which are clearly visible in their normal positions.

Hearing tests made at the time of this examination show: *Right Ear.* Low fork, not heard; medium fork, 1/10; Galton 2.9; Rinne negative; Schwabach shortened. *Left Ear.* Low fork, not heard; medium fork, not heard; Galton, 4.5; Rinne, negative; Schwabach, shortened. Weber referred to the right side..

Thus we have as end results in this case, complete loss of useful hearing in the left ear, and very marked impairment of hearing in the right ear. There is also probably a permanent paralysis of the left facial nerve, and almost complete destruction of right membrana tympani. The existing disability unfits this man for the pursuance of his pre-war occupation, which was in connection with advertising.

I do not believe there is any chance for improvement in the hearing. It is more likely he will gradually lose the little hearing now remaining. As an ex-service man, he is entitled to, and is receiving, vocational training provided by the government. At the present time he is learning rose culture and is about to be given a course in lip-reading. By following out this plan, there is every reason to believe that the man will become a self-supporting and useful citizen in spite of his physical handicap.

Dr. Wagers (in closing): It is true that certain tests were not made in this case, but from lack of opportunity. I saw this man but once on December 4, on which date he left the city and did not return until this morning. I have not had time to do more in the way of examination than was done at his first visit. In giving the history of this case, I have been obliged to give such details as the patient was able to furnish, the various hospital records not being available. It would manifestly be unfair to say anything which might appear to criticize the work of any surgeon when the only knowledge of his work comes through a patient on whom he had operated, but the patient's statement is that the surgeon was not the one regularly doing the mastoid operating, and that facial paralysis resulted in another case operated by the same surgeon a few days previously. It is not, however, for me to say that his technique was at fault.

As I have already said, this man will be given a course in lip-reading which will prove of great benefit in enabling him to understand ordinary conversation.

DISCUSSION.

DR. GEORGE W. MACKENZIE: I would like to say something on this case, but before doing so may I suggest that in arranging for a program that the Society have fewer case reports in one evening? A member is limited to ten minutes in reporting a case; much of importance by way of detail must be left out of the report. It is hardly fair to the reporter.

Dr. Wagers did very well in the ten minutes allotted to him; however, with more time he might have been able to tell more about the functional test findings. He said that the patient's left ear was entirely destroyed as to hearing following the first operation. Dr. Wagers, of course, is not responsible for the first operation or for anything that may have happened following the operation. Later it appears that the patient developed a similar condition in the right ear. The first problem I would like to settle in my mind is whether this patient is absolutely deaf or not. I have observed that most of the failures that happen in work on the labyrinth were in those cases where there was doubt as to whether there was any hearing or not. Dr. Wagers either did not make accurate tests to determine the presence of complete deafness or else he did not have time enough to report the findings when reporting his case. Let us grant that Dr. Wagers is correct in the bare statement that the patient's hearing was destroyed. The next question to arise in one's mind is what was the deafness due to. The patient, as I understand, has had three operations, but evidently at no time a radical mastoid operation, since the hammer and anvil are present and intact. The end results are fairly good from the standpoint of the middle ear, but the patient's hearing is gone. From the patient's angle it would be more agreeable if the reverse of this were true. It is possible to destroy the hearing at the time of the mastoid operation by opening up accidentally the inner ear with consequent extension of suppuration to the perceiving apparatus. It is hardly conceivable that this is what happened in the case, since there is no facial paralysis. To injure the osseus labyrinth at its most vulnerable region (vestibule) during the mastoid operation the facial could hardly have escaped. I would like to know whether this patient suffered from a labyrinth suppuration following his first operation. If he did not, then the loss of hearing must have been due to something else. The most frequent cause for complete loss of hearing is syphilis of the eighth nerve. The case is so incompletely reported that we are left too much in the dark as to what was the cause of the patient's deafness. None of us know from the report just what the pathologic condition is that destroyed the patient's hearing. This criticism is not meant for Dr. Wagers, but for ourselves for limiting the time in the reporting of cases. With more time, no doubt, he could have told much more about it that might have been instructive.

DR. DAVID N. HUSIK: I personally was very much interested in this case of adenocarcinoma presented by Dr. Butler. It is unusual to see a case alive ten or eleven ears after a diagnosis of adenocarcinoma of the nares has been made. Several years ago I presented before this Society a case of adenocarcinoma of the middle turbinate, antrum, and ethmoids, in a man thirty-two years of age, the diagnosis having been made by the pathologist.

As soon as the diagnosis had been made, we began treating him with radium, and X-ray, but with little benefit. He was finally admitted to the hospital for a radical operation, the superior maxilla, middle turbinate, antrum, and ethmoids were completely removed. It is now over two years since his operation, and at my last examination, which was last Saturday, there is no sign of recurrence. I had the occasion to look up the literature on this subject, and I found some two hundred cases reported of nasal adenocarcinoma, and almost without exception nearly all recurred after operation, in from six months to two years, and some before they left the hospital. I would like to ask Dr. Butler if this case was diagnosed pathologically as an adenocarcinoma ten years ago when the patient was first seen.

Fibroma of Nasopharynx Case Presentation. Dr. Herman B. Cohen.

Mr. T. C., 36 years old, complains of (1) nasal obstruction, (2) interference with deglutition, (3) heavy mucopurulent discharge, (4) impaired hearing, (5) impaired voice and speech, (6) drowsiness and aprosexia, (7) more or less epistaxis. Mr. C. has noticed this condition for four or five years. He has had no treatment to give him relief and no operations upon the nose or throat to the best of his knowledge.

Objectively, the man's face is long, mouth open constantly, the voice is flat and his facial appearance, generally characteristic of the "frog face" type. Expiration is impossible, inspiration even with the greatest effort is only slightly successful. The inferior nasal passages are bathed with a thick mucopurulent discharge. There is no evidence of nasal polyps present. Passage of a diagnostic probe is successful, through the posterior choana, only along the lower margin; a mass attached to the lateral and mesial or septal margin prevents the sound from making a complete circle. Examination was followed by bleeding from the left nares, which was not easily checked. Indirect examination reveals a mass, pinkish white, the lower surface more or less lobulated, the membranous covering interpenetrated by a fairly rich blood supply. Digital examination showed the mass' attachment to the basi sphenoid and upper margins of the choana and vomeric edge of the septum.

An accurate diagnosis can only be made by the aid of the microscope. Nasopharyngeal fibromata are rare in the female sex and are most often seen between 15 and 25 years of age, after which involution usually begins. The origin, which may be from the base of the sphenoid, perpendicular plate of the palate bone, posterior ends of the upper turbinate bodies, or the posterior portion of the vomer, is in contradistinction to polyps of the nose or choanal polyps.

Papillomata usually occurs at the palatal pillare, soft palate and uvula; Angiomata, in the soft palate or palatal pillars (angiomata being rather rare, as are Myxomata). Teratoma or hairy polypi and Cystoma are not common, the latter do not bleed as readily, are pure retention cysts or mucoceles and occur after the twentieth year. Teratoma are diagnosed after removal. Lymphadenoma, a not uncommon tumor, will of course arise in any of the disseminated lymphoid tissue of the pharynx.

To distinguish it from sarcoma, particularly a spindle cell sarcoma, is not an easy task, as histologically they are not very different. However, considering the above mentioned factors, let us recall the general pathology of neoplasms of the pharynx. Quoting Ballenger, "we find that the lower portion of the pharynx or oropharynx is more often the seat of malignancy than the upper; the glandular element being less in the region of the upper choanal margins." The lower and lateral attachments of the tumor in question are due purely to inflammatory adhesions.

"Sarcoma is rarely or never, whereas soft fibroma is frequently, pedunculated. Hard fibromata are usually sessile."

Further, glandular involvement in sarcoma often occurs late and this factor cannot help very much in making an early diagnosis.

I must make mention, in passing, of Thornwaldt's Disease or Bursitis, with its consequent nasopharyngeal stenosis.

The age of Mr. C., 36, takes him out of the 15 to 25 year class, when involution should be going on. The growth, therefore, may at the present time be undergoing sarcomatous change, or, if left untreated, will cause aggravated symptoms mentioned above or some of the following complications: growing into the nasal chambers may force the nasal bones apart with a flattening of the bridge of the nose; consequent bulging of the eyes, completing the "frog face" picture; increased growth will produce pressure upon the lachrymal canals with resulting epihora; outward extensions would produce exophthalmia; or reaching the antrum will produce a swelling of the cheek; the most dangerous extension of course being upward into the brain.

Ast to treatment: There are, probably, from ten to twelve different methods of attacking such growths. Many are very radical and many are accompanied with considerable bleeding, so much so that one must be prepared to do a ligation of the external carotid artery. Electricity

in my estimation has here a very promising field, either for the complete removal or as a preliminary to surgical interference. We have, accordingly, given the patient for the first treatment a total of 220 milamperes, on Saturday, December 31, the negative pole of the galvanic current being inserted first through the nose and later through the mouth. I shall not attempt at this time to describe the different methods pursued to remove such growths.

DR. ROBERT J. HUNTER: In the South I have seen cases in which the Texas screw worm fly laid eggs in secretions of the nose. In some of those cases the sinuses and the nose are filled with the larva and they may come out the ear, having gone through the Eustachian tube, or been laid in the secretion of a discharging ear. These cases are usually seen in people of unclean habits. Down there, they sleep outdoors a great deal, especially in Mexico. One case occurred in an American child who had been sleeping out in a hammock. The larvae are alive. The pain is intense when they reach the larval stage on account of the pressure. The best method is to use chloroform, which kills the larvae and they can then be dug out. The odor is very offensive.

Complications of Tonsillectomy. (a) Anomalous Internal Carotid. (b) Paralysis of Palate. Dr. Robert J. Hunter.

Neither of my patients has come. The first was one that was seen in my clinic at the Howard Hospital by Dr. Cohen. It was very interesting in that you could see a large pulsating vessel in the lateral pharyngeal wall just back of, or posterior to, the tonsil. These cases are not so very rare; at least one has been reported in which the operator was unfortunate enough to cut into the artery. I think that a little care will prevent that. It is well to look the cases over from that standpoint before operating. There are several interesting articles written on this subject by Drs. George Wood, P. G. Skillern, and others. It was unquestionably carotid in this case because of the size of the artery. When the vessel is as large as in this case, a tortuous internal carotid is usually the artery involved.

The second case, announced as paralysis of the palate, was really improperly named. The patient went to New York to have the tonsils properly removed. Not only were the tonsils taken out, but also the posterior pillars on both sides; and when he drank, fluids came out of the nose. True paralysis of the palate is seen, at times, in cases following tonsil operations, especially in children, where they are unable to swallow food freely and sometimes liquid food comes out the nose. It is usually due to trauma, sometimes due to wounding of muscle, and sometimes to stretching of the palate. These cases almost always recover in a few weeks. In one case I saw, paralysis occurred in a case in which the operation, done a year before, seemed to be perfect. Paralysis of the palate was definite, but one could see that there had been unusual trauma. I was never able to account for this case. It followed the tonsillectomy very definitely. In view of the fact that there was no evidence of trauma and that the operation was done very beautifully, I thought the case might be one of secondary infection with diphtheria, and that paralysis had followed. One year had elapsed and it is probable that the paralysis would have cleared up by that time.

Dr. Robert J. Hunter (in closing): I did not look up the literature on these cases. Dr. Husik tells me that Dr. J. Parsons Schaeffer has recently published an interesting article on this subject in the Jr. A. M. A. I regret to say that I have not yet read it. Wyeth went into this subject very carefully when he wrote his prize essay on the question of ligation of the carotids. He speaks there of an anomalous course of the carotid and he takes issue with Quain on the question of branches arising from the internal carotid in its course through the neck. I know that some cases of hemorrhage from the tonsils are due to the ascending pharyngeal artery. I am not acquainted with Zuckerkandl's work, but researches carried on right in this city, at the dissecting room at the University of Pennsylvania, have shown anomalies of the internal carotid artery in which it occupied a very superficial place in the lateral pharyngeal wall just posterior to the tonsil. In the living subject the only way to judge

is from the size of the vessel. I base my diagnosis of internal carotid on the great size and marked pulsation of the vessel, which may be seen, and palpated in the pharynx.

DISCUSSION.

DR. GEORGE W. MACKENZIE: It was pointed out long ago by Zuckerkandl and others that most of the cases of supposed atypical internal carotid arteries presenting laterally and behind the posterior pillar of the fauces were really large ascending arteries. I would not like to say that an atypical internal carotid could not present itself as described by Dr. Hunter; nevertheless, I am forced to believe that most of the cases so reported are not.

A stated meeting of the Philadelphia Laryngological Society was held on Tuesday, February 7, 1922, College of Physicians, at 8:15 p. m.

Post-Operative Lung Abscess, Complicating Tonsillectomy and Adenoidectomy. Dr. William F. Moore.

Published in September, 1922, issue of THE LARYNGOSCOPE.

1. **An Instrument to Guard Against Infected Material Entering the Larynx During Tonsillectomy—(Tonsillectomy Sump).** Dr. William F. Moore.

Published in September, 1922, issue of THE LARYNGOSCOPE.

DISCUSSION.

DR. P. S. STOUT: I do not think so very many have had the privilege of using this instrument. Anything that will lessen the danger of inspiration pneumonia will be a step in the right direction, if it does not complicate the operator at all. We should not allow the instrument to prolong the operation. I feel that Dr. Moore has made a step in the right direction and is working along the preventive measures. The instrument works very well. The advantages are as Dr. Moore has stated.

DR. M. S. ERSNER: I would like to ask Dr. Moore if this instrument is used only for the tonsils and not for the adenoids.

DR. WM. F. MOORE: It is only for the tonsils.

DR. G. W. MACKENZIE: Dr. Chevalier Jackson was to have been here tonight to discuss Dr. Moore's paper. I will read a letter he has sent:

"I regret very much my inability to be present to discuss Dr. Moore's paper. I have had the pleasure of reading it and most heartily endorse all of his conclusions. I would particularly emphasize the importance of the point he makes of not abolishing the cough reflex, which is the watch dog of the lungs. The tonsillectomy sump appeals to me as a most ingenious and effective means of preventing aspiration of clots and infective material into the lungs. Possibly some cases of pulmonary abscess are of hematogenous origin; but this does not prove that aspiration of infective material is not an even more frequent cause."

DR. HENRY S. WIEDER: I have heard a number of experiences recently on the question of lung abscess. It seems that the universal opinion is that there is a marked increase in the instances of lung abscess in the last ten years. Whether this has been due to the increased use of X-Ray, I do not know. But it has occurred to me that it may be due to the fact of the change of method of the operator. There used to be only a few methods and operators used to use one method and stick to it. Most of the operators today are using the Sluder, etc. In doing that operation, whenever you evert the tonsil you always, as Dr. Moore has said, empty the crypts. I personally have never been very keen about the aspiration theory. Dr. Fetterolf recently pointed out that sometimes it may be due to the fact that we pass sutures. But in the event that we do prove that aspiration is the important point in the production of lung abscess, I feel that it is our modern method of everting the tonsil that causes it. It is my practice when I am finished with the adenoids, I immediately turn patient on face and patient is lifted face down and carried to his room that way. Any idea that is going to help to keep debris out of the larynx is a good idea.

DR. WISHHART of Toronto: I have just come from Boston and I can give you two figures about the instance of lung abscess there in the throat

clinic. During the past twenty-two months there have been in the neighborhood of 6,000 or 7,000 tonsillectomies done, at least in two institutions, and during that time, on account of the interest that has arisen from the papers of Klendenny, etc., on lung abscess, there has been a great deal of discussion and interest in watching for lung abscess cases, and during that time we only know of four cases that have had either pneumonia or lung abscess after tonsillectomy. There has been a great deal of discussion, case after case has been followed and these are the only cases that have come up so far, and of those cases one case was definitely known to have a severe bronchitis before it was operated on, and this case was operated on at the urgent request of the medical staff. The theory is that the instance of lung abscess is much overdone or other factors have not been seriously enough taken into consideration. A great many operations have been done by physicians of little experience, too, the anesthetic being given by nurses in training. There are still other factors to be discussed.

DR. HODGE of Montreal: I have not very much to add to the discussion except to say that during the past three or four years in Montreal we have been using, particularly in our adult cases, local anesthesia. We have excellent results.

DR. MOORE (in closing): Dr. Wishhart states that four or five cases in 6,000 or 7,000 in the Massachusetts General Hospital have occurred. That is about the right ratio. In analysis of 400,000 cases that have been reported in this country and Canada and some in Europe, they have been in about the proportion of 1 in 3,000. That would just about bear his theory out. His is a little light. It is a very common practice in Boston to operate on your ether cases in the semi-recumbent position. As I say, it is too early to analyze these results fully. There have been more abscesses from the semi-recumbent position as used in Boston than in any other state in this country. I am sorry this table could not have been made larger so that you could all see it. The startling factor is the great number of cases that have been reported. Where institutional reports came in, we threw it out because we did not know whether we were overlapping cases. We have individual cases from diversified towns all over the country reported. We have 153 cases from a little over 400.000 reported authentic tonsillectomies. The great majority of men with few exceptions have stated the number of tonsillectomies they have done as long as they have been practicing. The ones who did not so state we averaged five hundred cases for them. In these 153 cases, there have been 30 cases reported under local anesthesia. There are twenty-three cases which have been done under ether anesthesia in a semi-recumbent position. We have endeavored to establish the lobe of the lung so that we can draw some conclusions as to the effect of aspiration material going straight down. The great majority of these occurred in the lower lobes. either in the lower left or lower right. Another interesting thing that has been brought out has been the diagnosis of previous pulmonary conditions. A great many of these have had a pre-existing and established tuberculosis before operation and later developed lung abscess. The mortality has been usually assumed to be 54 per cent or 50 per cent in operative cases and 25 per cent in non-operative cases. We would be much lower; it would be 16 per cent for operative cases and 10½ per cent for non-operative cases.

Report of a Case of Primary Petrosal Sinusitis. Dr. W. G. Shemeley, Jr.

This most interesting case, thoroughly reported and carefully diagnosed, showed a previous history of a running ear for two years. Suddenly there developed a "cold on the left side of the face," in reality a trifacial neuralgia, with severe pain extending up over the left temple; there is a spot in the left temporal region which is tender to deep digital pressure. The eye findings are normal; the blood count showed a leucocyte count of 10,000. Urinalysis and spinal fluid are practically normal. The roentgenologist saw a shadow in the temporal region and suspected a brain abscess; in addition to this the X-ray shows a chronic mastoiditis on the left side.

Dr. Mackenzie was consulted and suggested the diagnosis, which was confirmed at the operation. At the time of the first operation the inner wall of the antrum was found to be necrotic in the triangle bounded posteriorly by the anterior margin of the sigmoid sinus, superiorly by the tegmen antri and anteriorly by the external and superior semicircular canals. The bone over the lateral sinus was found normal and after its removal the sinus itself was apparently normal, except that it did not refill rapidly after it was compressed with the finger. Curetting the carious bone on the inner wall of the antrum led toward the junction of the superior and posterior surfaces of the petrous bone in the region of the superior petrossal sinus. After ligating the jugular the lateral sinus was exposed and an extensive red thrombus was found extending toward the torcular. It was hoped that the expulsion of this thrombus would bring with it the thrombus in the superior petrosal sinus. The superior petrosal sinus was not opened at this time.

The subsequent course of the case was favorable for three days, when the symptoms of thrombosis flared up again with characteristic pyemic temperature, trifacial neuralgia, delirium, and leucocytosis.

Dr. Mackenzie, at the secondary operation, opened the superior petrosal sinus and removed a small red thrombus and introduced a narrow strip of gauze into the sinus; notwithstanding, the patient's condition progressed unfavorably; facial spasms supervened and eye symptoms developed,—slight exophthalmos, with inequality of the pupils, and lessened reflexes. The patient died five days following the second operation.

Post mortem findings showed a circumscribed purulent meningitis in the region of the superior petrosal sinus. The sinus contained a clot about three-fourths of an inch long anteriorly extending into the cavernous sinus, which was also thrombosed.

The author in commenting on the case feels that it would be justifiable to more thoroughly expose the petrosal sinus, even at the sacrifice of the labyrinth, in those cases where the symptoms are so clear cut.

Dr. Lewis Fisher: Would Dr. Shemeley be kind enough to tell me why he attaches so much importance to the neuralgia of the trigeminal from the diagnostic standpoint? I personally do not recollect having seen a trigeminal neuralgia.

Dr. H. A. Schatz: Did I understand correctly that in the way of treatment the recommendation is the removal of the entire labyrinth so as to obtain better exposure and opening of the sinus?

Dr. Wm. G. Shemeley (in closing): I will first answer Dr. Fisher's question—why we attach so much importance to the neuralgia of the trigeminal. If you will recall the position of the petrosal sinus as it passes from the temporal bone, you will find that there is a rather close association between the trigeminal and the sinus itself. A toxic neuritis process due to irritation from the thrombosis upon the nerve itself may result. In answer to Dr. Schatz's question as to whether we would advocate sacrificing the entire labyrinth in order to obtain better exposure as a means of operative treatment—yes, for this reason: In the first operation, the patient was not in good condition. We had much difficulty in getting free bleeding from the lateral sinus, as we mentioned; we had hoped that as we pull out the blood clot to produce enough suction to empty the petrosal sinus we would do away with the condition. The fact that the man was improving elated me, but Dr. Mackenzie was suspicious. I still felt elated until the man began to spring a temperature. That was about the usual time of the first re-dressing, so we thought nothing of that. That really was the beginning of the trouble. I was misled by the first redressing temperature. We could not expose the superior petrosal without sacrificing the labyrinth. We were fearful of further complications. We felt that if the diagnosis is thrombosis, sacrifice your labyrinth. At the first operation there had been an exposure. We had been probing it, but because this area was so small we had to drop it. The probabilities are that symptoms may be due to cavernous involvement plus what was due to our superior petrosal. Here is a man who practi-

cally twelve hours before he died showed first pupilary changes, six hours before he died first disc changes. I was fortunate enough to have some of the men over from the College and they had the opportunity to observe the case.

DISCUSSION.

DR. BENJAMIN H. SHUSTER: Any man who does an operation says his method is the best. The more I hear of different methods, the more I am convinced that the indications are to do a tonsillectomy by the method you can best do it. I naturally dislike any method that requires exaggeration or resistance. I think the simplest way of doing anything is the best. As far as the methods of tonsillectomy are concerned, I believe there is not a prettier method than the La Force method when it is done right. In Dr. Coates' Clinic, we use the eversion method. It is something like the dissection method. It is not really a dissection, merely a nick about a half inch and with the assistance of the snare we push out the tonsil and it comes out as cleanly as possible.

With regard to hemorrhage, it really makes no difference whether a patient loses a teaspoonful or three teaspoonfuls of blood. It is only a question of stopping a hemorrhage so that patient does not lose an excessive amount. Secondary hemorrhage coming up within eight or ten hours, or if later, is not really the fault of the operation. When it comes an hour or two after operation, it is the fault of the operator. I have seen some hemorrhages occur a week after operation. It seems to me that the only method is the one that you get used to. The simpler the method the better it is.

DR. P. S. STOUT: Some time ago some one thought that the reason we had a certain amount of loss of power of the soft palate was due to the fact that there is too much trauma at the time of operation. I do not think it is quite necessary to use a sponge or pad in each fossae of an adult. I know of one man in this city who does a large amount of work and I have never seen him use a sponge once. He sees that the bleeding points are checked during the time of operation. Dr. Stein spoke of nothing but the muscle being left. I am afraid possibly that is the fact. We do not want to just leave the muscle, but to leave the capsule. That is not exactly true. The muscle is covered with its own membrane and the tonsil has its own. In certain operations we certainly can leave the muscle covered with a nice clean membrane.

DR. E. J. STEIN (in closing): I fully expected to be criticized. All I can repeat is that I am thoroughly in earnest in what I have said. I would simply say that I would be willing to take any resident in any hospital, after he has seen the operation, and tell him what to do and he will find it easy. The same way with any etherizer. I do not believe that you can criticize any method, the La Force, etc. The thing to criticize is the principle of the operation. I have seen a good many throats with very severe scarring. I am proud to say that since I have been using the Sluder technic, I have not had severe scarring. I do not propose to go back to any dissection except when I am forced to. Concerning the stoppage of hemorrhage, I meant to say that I have used the sponges invariably. I see no reason why it should not be done. In slightly over 1,000 cases there have been no untoward results. I have had no hemorrhages. I am working in a country community with no trained help and it would be very serious if I did have hemorrhages. With regard to the catheter in the nose, I was not aware that Dr. Beck had discontinued it, as Dr. Mackenzie informs me. I like them very much and I use them. I did not mean to say that the bare muscle was exposed. I meant to say that the so-called capsule of the tonsil is removed and you have an absolutely smooth surface. I will say that you have a great deal more sloughing in the Sluder than you have in some dissection method. At the same time you will not have any tissue left. The first six months is the hardest time for you to retain any faith in this method. It is not difficult; it looks very simple and once you have gotten on to it, it is as simple as it looks.

A stated meeting of the Philadelphia Laryngological Society was held on Tuesday, March 7, 1922, Cadwalader Hall, College of Physicians, at 8:15 p. m.

Chronic Catarrh of the Nasopharynx. Dr. D. J. G. Wishart of Toronto, Canada (by invitation).

DISCUSSION.

DR. GEORGE M. COATES: I have been very much interested indeed, as I am sure the rest of you have, in this beautiful, historical paper of Dr. Wishart's. When I was asked to discuss this paper, I confess I was entirely at a loss as to what phase of the subject he would take up. Just before Dr. Wishart started to read his paper, he told me he thought I would have a hard time in opening the discussion, and I agree with him. I do not think I can add much to the paper. I have been very much in the position of Phillips, as quoted by Dr. Wishart. This disease or these symptoms have not taken up much space in my mind as an entity or as a disease. It has almost escaped me. I think almost all of us have begun to realize these symptoms are usually caused by anterior nasal trouble or secondary to diseased tonsils or diseased adenoids. Those conditions are not really post pharyngeal catarrh, but they do, however, cause some of the symptoms. Hyperplastic conditions of the posterior ethmoid and sphenoid cells give us this symptom complete. I have recently had the opportunity of examining a great many ex-service men, 1,500 or more, and making careful examinations. In a great many of these men from whom the tonsils and adenoids have been removed, we find considerable lymphoid tissue remaining. They give symptoms of post-nasal obstruction and of mucous dropping down. That picture I was brought up to consider a post-nasal catarrh, but for a long time have gotten out of the habit of calling it that. I have long considered that the disease had decreased or possibly become non-existent because we no longer use the term. We now say, I think, more frequently disease of the posterior ethmoid cells, remnant adenoid in naso-pharynx, etc. A patient comes to you complaining of catarrh, which does not mean anything. What you want are the symptoms that the patient complains of.

I was very much pleased that Dr. Wishart brought this subject up, because, as I said, I think many of us have forgotten about it. We should look further and find the origin of post-nasal catarrh. Even if it is a distinct disease, it is almost always secondary to naso-pharyngeal infections. Get the breathing back to normal (not too large a space) and in a great majority of cases these symptoms will be improved. A great many are improved by tonsillectomies and adenoidectomies. I believe that tonsillectomies do cause cessation of these symptoms. In any case, we should investigate our cases, investigate the tonsils and see that the patient has, above all, physiological breathing and that means neither too little nor too much.

DR. EMIL MAYER of New York: I did not expect to take part in the discussion, but merely wanted to shake hands with some of the members of this Society. I was very much interested in the subject that was presented. When we look over our various medical journals and read the programs of the Societies, we see all the various operative measures and very few of the clinical presentations such as was presented tonight. It is of interest from many points of view. In the first place, the historical question brought back to the time when laryngology knew no adrenalin, cocain, no daily spray used to relieve the excessive secretion, to the modern time when we have every method we can think of to clear out either the obstruction or the diseased condition if it happened to be some infection of the sinuses. Everything has been said that can be said as to what we can do surgically. There are other things. We often forget that we are doctors. We treat noses, we treat throats. How many of us go through the routine, how many make it a rule to examine the ears of every patient who comes to us whether they complain or not, to see whether there is a little papillomata, etc.? Sometimes a little attention to a small thing of that kind would mean a great deal. I have seen patients start with a little minor trouble and eventually have an ex-

tensive disease of the post-nasal space as a result of this trouble that began, say, some winter. We neglect many conditions that the patient had. How frequently have we found that the patient's diet, if changed, will help. There are so many things that can be done. Often patient's general condition is bad. Many do well with a course of treatment of arsenical solution. I merely mention this to call attention to the fact that I feel that Dr. Wishart has really done us a great service in calling our attention to certain symptoms of so-called catarrh of our patients and that we ought to attend to. I think we make the greatest mistake in that we do not educate patients generally in the need of proper early attention. A tinnitus aurium if seen early can invariably be cured and cannot be helped if existing one or two years.

Dr. George B. Wood: I have nothing further to add. I think that post-nasal catarrh is really dependent on some other condition, particularly sinus disease and remnants of adenoid tissue.

Dr. George W. Mackenzie: The subject presented by Dr. Wishart is a very broad one and difficult to cover in a single evening. I wish to draw your attention to the differentiation between the clinical diagnosis and the pathologic one. Most of the gentlemen who have thus far spoken, have treated the subject from a clinical standpoint.

The average patient who goes to the doctor complaining of nasal catarrh refers to post-nasal dropping and obstruction to nasal respiration. If we exclude sinus disease, with polyps, and septal deflections, there still remains to be considered primary catarrhal rhinitis, generally referred to as hyperplastic rhinitis, as a result of continued cold or inhalation of irritating dust; a congestion results, which in turn means hypernutrition. This hyper-nutrition leads to an overgrowth of connective tissue; in other words, hyperplasia in contra-distinction to the hyperplasias which are composed of more or less normal tissue. It is these hyperplasias along the inferior edge and posterior ends of the inferior turbinate particularly that tends to obstruct nasal respiration and produce an increase in the amount of mucous secretion and at the same time changes the character of the secretion. The indications are to remove the redundant oversecreting hyperplastic tissue, which in the majority of cases brings most excellent results.

In closing I wish to compliment the essayist on his excellent presentation of this broad subject of catarrh.

Dr. C. J. Kistler, Lehighton: I am such a recent member here that I hesitate to say anything, yet I appreciate so much this paper tonight. We hear much at a meeting like this of pure specialism, and I sometimes wonder, as suggested by Dr. Mayer, if we do not too often forget our general medicine. We should not forget that the ear, nose and throat are only parts of the general body. In a great many of these patients who come to us with these symptoms, we find thickened and dry membrane, congested nasal tissue, pharynx, tonsils, etc., etc. If we devote a little time to examine their general history, we find that very many of them are suffering from some form of digestive trouble. In taking care of their general health, improving their diet, regulating the bowels and habits of eating and drinking, etc., it is wonderful, at times, how the whole nose and naso-pharynx will clear up with the improvement in their general condition. I feel that, perhaps, many operations are done before the general condition is investigated and cleared up. Dr. Wishart also touched on a very important thing in the question of people coming to our office with so-called "catarrh." We ask them what do they mean by "catarrh." What does it mean? Catarrh, a Greek derivative, means "discharge," and nothing more. It is simply a symptom. I think the very first thing is to investigate the general health and habits of these patients who suffer from post-nasal dropping. Let me repeat, they are very frequently due to a chronic congestion of the gastro-intestinal tract from indiscretion in eating and living. Of course, that is only one of many of the causes, not directly due to intra-nasal disease. The ends of four or five cigars sticking out of a vest pocket will very frequently not only suggest the cause, but also the remedy, of the condition so forcibly brought to our attention by Dr. Wishart. Of course, I do not wish to be

understood as discounting, in the least, anything that has been said here regarding the intra-nasal causes of this very common complaint, but I do feel that, as rhinologists, we should not overlook this phase,—may I say, the medical and non-operative treatment. I want personally to thank Dr. Wishart for the very instructive and timely paper.

DR. ROSS H. SKILLERN: There is one point in the etiology of a certain form of this so-called post-nasal disease which has not as yet been mentioned. That is the post-nasal discharge that results from the deviated septums. The patient says that he had catarrh, he is stopped up. The discharge goes back. He says he has a catarrh of the back part of the nose. We all know that the nasal mucosa secretes about a pint of fluid a day. If there is a marked deviation on one side of the nose, the air does not pass through that side, consequently the secretions collect and come down and finally come down in a large mass from the back of the nose. Those patients always have catarrh. It is merely the physiological process gone wrong and the deviation constitutes an etiological factor.

DR. HENRY S. WIEDER: I would like to say that I believe we have lost track of one phase of the subject and that is that we may have an increased amount or abnormal nature of natural secretion of the naso-pharynx. Where there has been preceding intranasal disease for a long time, we often see a glazed, dry appearance of the naso-pharynx, and we may have the alteration of the post-nasal tissues. Often after the nasal condition has been corrected, we frequently see a sticky adherent mucoid on the post-pharyngeal wall due to any increase, decrease or alteration of secretion normally present. We must not be purely laryngologist. There is no question that the endocrines play a part in the nature of our secretions. We know that in the leib-thyroid state they do. I have seen marked benefit in these cases by administering a couple of grains of thyroid at night. The patients have said that while they do have some mucous, it moves and they can swallow it. I have not had a long experience with it, but in the six months that I have used it, I have found great satisfaction in getting rid of this sticky mucous by its administration. As we understand more about the actions of the endocrines as they apply to the nose and throat, we will be able to apply them to still better effect.

DR. D. J. G. WISHART (in closing): Nobody could help but appreciate the spirit in which this paper has been taken and the remarks of those who have spoken. I do not know how it is here, but I know that in Canada at least we have frequently large sections of certain newspapers devoted to advertisements from men from Boston and elsewhere who entertain the public with their "secretions of catarrh." Catarrh is a discharge, it is a dropping down. We have a catarrh of the bladder, intestines and stomach. When a patient says he has catarrh, why should he not be talking about catarrh of the stomach or something else? I would like to see the word taken away. It would take away a great deal from the people who advertise. In reading these books that I have been speaking about today, I knew that I had seen them before. I appreciate the remarks that have been made. I did not intend to take up the treatment of catarrh nor the causes, but I wanted to point out that possibly we have something of our own, called American catarrh, and disabuse our means of that fact. It is very interesting, however, in reading what men have thought and worked out and compare it with present day beliefs. It is hard to realize that such a disease has practically disappeared. The quotations I have taken from various parts of this country seem to indicate that there is a looseness yet of the idea of what catarrh means. I would like to see that done away with. As Dr. Skillern says, we secrete a pint of fluid every day and it is absorbed by the air. The dropping the patient complains of is simply due sometimes to a habit that they have gotten into of hawking. I am delighted if the topic which I introduced tonight has made us think.

The monthly meeting of the Philadelphia Laryngological Society was held Tuesday evening, April 18, 1922, at Cadwalader Hall, College of Physicians, at 8:15.

Demonstration of Instrument: "A Bronchoscopic Tack and Pin Forceps." Dr. Gabriel Tucker.

(To appear in a subsequent issue of THE LARYNGOSCOPE.*)*

DISCUSSION.

DR. R. F. RIDPATH: I think Dr. Tucker is to be congratulated on the instrument that he has presented this evening. Any one who has done any bronchoscopic work knows how hard it is to extract a pin; it is the most difficult of all foreign bodies in the bronchi. I am glad he has mentioned one fact, which is a very important one, and that is always to have an X-ray taken of your subject; the nearer the time of the attempt at removal, the better, as these foreign bodies move from time to time. Even an hour will make a great difference in the position of these foreign bodies.

"The After Results of the Different Methods of Tonsillectomy, with Special Reference to the La Force as Compared with the Ordinary Dissection with Snare." A Critical Review of 200 Cases. Dr. Reese Patterson (by invitation).

To appear in a subsequent issue of THE LARYNGOSCOPE.

MRS. L. D. THOMPSON, Chief Anesthetist at the Polyclinic Hospital: In regard to Dr. Patterson's paper, what methods have impressed me from the standpoint of the anesthesia: Method of dissection,—length of time for induction is longer because complete relaxation is required before starting to dissect. There is greater interference with the continuance of the anesthesia, consequently you have an uneven anesthesia. The patient is constantly upset, as it is difficult to keep up an even maintenance. The actual time of dissection is not really much longer, but the length of time is usually protracted waiting for the proper relaxation of your patient. With the La Force method, you have the short induction because the instrument is applied in the primary stage of the anesthesia. The time the instrument remains on the tonsil, you can continue your anesthetic, consequently when you are ready to remove the adenoids, the patient is relaxed fairly well and no more anesthesia is needed and the patient reacts very quickly.

DISCUSSION.

DR. LEON FELDERMAN: I would like to know more about the age of these patients on whom the La Force was used and whether they were chronic cases. You hear so much of this method being used in children and not in adults.

DR. H. B. ADAMS: I use the La Force as well as the dissecting method. The only particular result of the La Force method that I notice is that after the tonsils are removed, the pillars fall together very quickly. That in itself is quite in favor of the La Force, showing that the pillars are not injured. They fall naturally into the place they had before. The dissecting method is not a particularly longer operation if it is done well, but I think there is rather more hemorrhage and there is this difference in the pillars. There is always bleeding. I do not believe in pressure. I think the proper course is to grasp the blood vessel. When one puts in a suture, which is occasionally necessary, the suture must always be removed within twenty-four hours or there is always more or less tear of the soft tissues.

DR. BENJAMIN SHUSTER: Last year there was an observation made by a layman—one of the Social Service workers asked the question why it was that in one clinic three days a week, the children that were operated on returned to school much sooner, two or three days sooner, than the children that were operated on the other three days. On the three days that they were delayed were the days that the snare method was used. It was done by the same men who did the La Force method on the opposite three days. It seems as though those throats were more traumatized when the snare method was used. Another point was, the number of cases that required sutures in the snare method. I noticed that there were very few cases when the La Force method was used that needed suture of the pillars at the time of operation. Over two months, there were only two cases that required sutures. During the past summer at

the Philadelphia Hospital for Contagious Diseases, there were many cases of children who had been weakened through scarlet fever and who were in no condition at all to lose blood and there was also a possibility of reinfection, in which tonsillectomies were performed. We used the La Force method altogether because they certainly do bleed with the snare method. Out of twenty-odd cases that I did with the La Force method, only in one case did I have to suture the pillars. These cases of scarlet fever bleed very easily and therefore the La Force was certainly the ideal method.

DR. H. A. SCHATZ: About a year ago, I followed a series of cases at the Polyclinic, comparing the results, and after a while I thought that I got to the point where I could diagnose the day after operation, where the La Force or the snare method was used. Whenever the snare was used, there was a considerable amount of edema, the parts were red and swollen. I always found it absent when the La Force instrument was used. Likewise, the bed of the fossa was always brought forward and looked shallower with the snare method. The base was always very granular with the La Force. But the snare method left a much smoother surface. I fully agree with Dr. Patterson in favor of the La Force method.

DR. P. S. STOUT: I happened to have the first twenty-five of these La Force instruments. I am not very well pleased with the throats of the children that I first used this instrument on. I think you will find the scars are a little bit more prominent than if they had been properly done with the snare. I suppose after tonight all the post-graduate students will use this method, but we must not forget the fact that sometimes after the La Force we will have some terrific hemorrhages. You will sometimes be called out at two or three o'clock in the morning, and you will have some difficulty in checking this hemorrhage. Don't be too sure that this is the ideal method.

DR. LOUIS BAER: With the La Force method, you cannot see just what you are doing, but with the scissors or snare you can see exactly what you are doing. As for hemorrhage, I have seen no difference at all.

DR. WM. F. MOORE: In regard to the observation by Dr. Schatz as to the edema at the side of the uvula, I cannot see why it should be more prevalent in the snare operations than in the La Force. I believe that the trouble is that the canula of the snare is not carried to the base. I have never seen it in any of my cases and I think that in as much as a great many of the post-graduate students are here tonight, I think it ought to be discussed.

DR. R. F. RIDPATH: I am very glad to have had the opportunity of hearing Dr. Patterson's paper tonight. It is very interesting and gives you data which I personally did not know of, although I followed out a great many of these cases. Of course, we teach all methods, but my personal preference is the La Force for various reasons. The La Force is not a 100 per cent instrument, as Dr. Patterson has said. Dr. Skillern and I were the first to use it in Philadelphia and develop it to the extent that it is at the present time. It can be used on either children or adults. It will take 95 or 97 per cent in children and about 85 to 87 per cent (perhaps a little more) in adults. It will not take out any tonsil that cannot be everted. You have to evert your tonsils to use the La Force instrument. It can be used equally well under local or ether, provided that the tonsil is one that the La Force can be used on. There are one or two things that I do want to speak to you about. The first is that you do have to know how to use the La Force. You can get the technic of taking out tonsils by all methods. You see the operator do it and then do it yourself afterwards. That is not so with the La Force. You have to be taught how to use it. I was surprised that Dr. Patterson gave the high number of cases when the La Force was used in which the anterior pillars have been removed. My personal experience is, I think, that in many, many tonsillectomies I have only taken four posterior pillars off, and two of these were the children of doctors. I was demonstrating to them that the pillars cannot be taken off by this method. The other case was an adherent tonsil in a child. The technic, however, has a great deal to do with it. If you will press your tonsil through and you can

see just exactly where your dry dissector will hit the tonsil, turn the pillar, you will not take the anterior pillars out. The other thing is that I have to take exception to Dr. Stout's remarks in regard to hemorrhage. I have only been called to three hemorrhages in seven years at the Medico-Chi Hospital in the great number of tonsils that we do there. I have never been called to the Jewish Hospital or St. Agnes Hospital for secondary hemorrhage when I use the La Force instrument. I cannot see why he had hemorrhage and the only thing that I can see is that the technic was not absolutely correct or the pressure was not used quite long enough. As far as the healing of these cases goes, there is very little pain attached to it, very little soreness and they apparently do recover quicker. There is one thing, however, that I do not think Dr. Patterson mentioned, and that is that no matter what kind of operation you perform, you will sometimes have the sticking together of the pillars. I do think, however, that you will have less of that in the La Force than you will have in other methods. I like the Beck-Muller method very well. I do not know that you will have as good results with that as you will have with the La Force. I do think that the La Force and the Beck-Muller methods are the best. I do not think the Beck-Muller is a 100 per cent instrument; no instrument is. You have to use various methods on some of these tonsils, but as a whole, I think the La Force is the best when it can be used properly.

DR. REESE PATTERSON (in closing): The first question, in regard to the age of these children, I think the average was from four to fifteen years of age. They were practically all youngsters, very few adults in this series of cases reported tonight. The question in regard to the reaction, that is one of the things that impressed me more than almost any other thing in this series of cases. There is a marked difference of reaction. After the snare method, the patients were sick, they did not want to open their mouths and for days they complained of that reaction. I think Dr. Schatz's observation is correct. I believe you can always look at those throats and tell which method has been employed. In regard to Dr. Stout's remark relative to hemorrhage, I think Dr. Ridpath answered very efficiently. In regard to the scar tissue, I will take exception with him. I have observed more scar tissue where the snare method was being used. One thing about the La Force method, I have yet to see a posterior pillar taken off. There is not a single soft palate injured. I think that in itself is in favor of the La Force. Another point that I have noted in this series is that you can always judge the result or injury of the pillars immediately after operation. It is perfectly possible for you to take off the whole anterior pillar. It does require experience and skill to use the La Force instrument. If you permit a great deal of traumatism to the pillars, they will often shrink away and disappear as though they were actually cut. You cannot see what you are doing with the La Force—that is one point in its favor. You do not have to see. You can tell by its feel.

In closing, I want to say that it has been a source of great gratification personally to find out from this series of observations some points in connection with the various technics. I believe there are splendid results obtained from each method. I believe that the snare method, although some men are doing splendid work with it, requires a great deal longer experience and a great deal more of mechanical skill to get good results than the La Force. The post-operative results convinced me at least that the La Force is a much superior instrument in the hands of the average operator than the snare.

Determination of the Line of the Descending Portion of the Facial Canal in Doing the Mastoid Operation. Illustrated with Lantern Slides. Dr. Frank A. Bridgett.

DISCUSSION.

DR. GEORGE W. MACKENZIE (opened the discussion): Dr. Bridgett deserves the thanks of this Society for having first brought to the attention of the profession something that promises to be of considerable worth in Otolaryngology. Dr. Bridgett was kind enough to bring to my office a

few weeks ago some of these specimens and the points that he makes, and the thought occurred to me that is it not strange that somebody else had not seen it before. The paper is one that is difficult to d.scuss because the things are undisputable and cannot be denied. Where we have a groove on any surface of the mastoid below or inward in the course of the sinus we are bound to have a corresponding elevation on the inside of the tympanic cavity when dissected out. Ordinarily, in surgery when we are in fear of doing some damage to a vital structure, do not steer clear of it; go right to it and find it. In this case, if one cleans out the mastoid cells until he comes to smooth bone, he is bound to come to this ridge which Dr. Bridgett has pointed out. By following forward, you have before you the location protected by the ridge of the descending portion near its exit of the facial canal. We have three excellent papers tonight. I believe original work by men connected with the Post-Graduate School should be encouraged and my wish is that some of these gentlemen will continue to do the same high class of work as they have done in the past, particularly Dr. Bridgett.

DR. E. B. GLEASON: When, some weeks ago, during the preparation of this paper, Dr. Bridgett came to my office with his specimens and demonstrated that there was a line of bone pointing to the stylo mastoid foramen, I felt that he had not only discovered something that was original, but also something which was of considerable importance in the course of the mastoid operation. It is possible in mastoids to remove the cells from the outer slope of the digastric groove from the inner slope in such a manner that it stands out in the mastoid groove. I told Dr. Bridgett before being too certain that he had discovered something that no one else had before, to take his paper to Randall and get him to ratify what I have told him. This he did. For many years, I pointed out the fact that you could locate in a mastoid operation the position of the stylo mastoid foramen by pushing your little finger forward along the digastric fossa until its further progress was impeded by the base of the stylo process. That is perfectly practical where the tip of the mastoid has been removed. Where it has not been removed, you can always guess the position by sinking your finger deep in the tissues and you will come in contact with structure which in a vague way you will make out to be the styloid process. Bridgett's discovery is superior to the fact that you visualize the exact position. When removing the cells sufficiently you will get this line. In a mastoid operation, ordinarily the upper portion of the descending part of the adducts foramen is somewhat readily made out. In the simple mastoid operation, you can generally see the hard bone of the semi-circular canal. With a little attention in throwing in the light, you will usually be able to make out the aqueductus Fallopii. When you can make out the lower end then you can see very readily through your mastoid wound the position of the facial nerve. It is always surrounded with hard bone. These remarks do not apply to the infantile type of mastoid bone nor do they apply to the so-called sclerosed bone where no cells are present.

DR. R. F. RIDPATH: Dr. Bridgett, I congratulate you.